# Coal Age

JUNE, 1952

A McGRAW-HILL PUBLICATION — PRICE 50c

## How to Build Markets for Coal

Successful 10-yr program shows how collective action turns tide for coal. p 70

## Pans Strip Cover

Tractors and pans strip economically at re-equipped Ohio property. p 98

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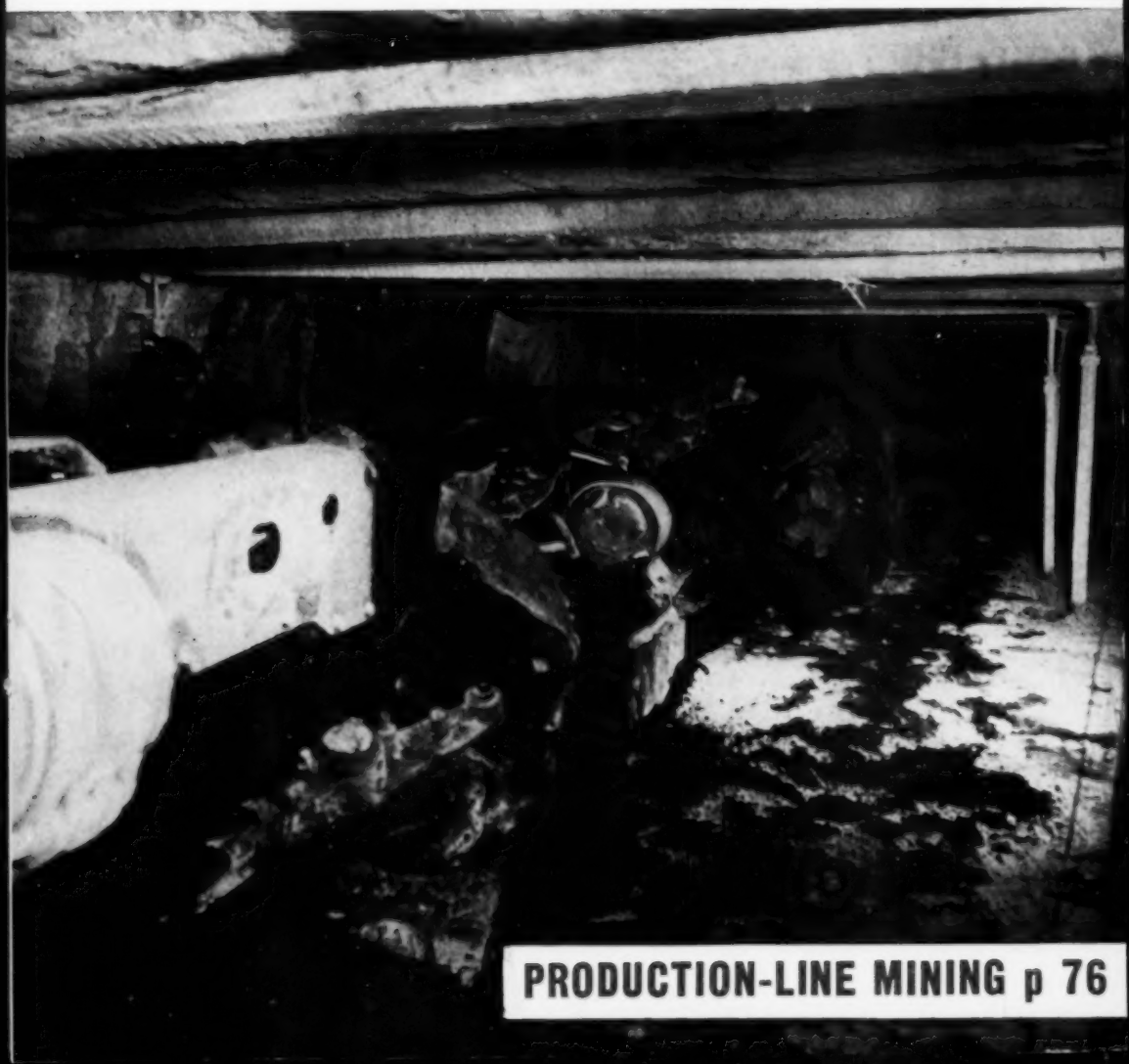

## PRODUCTION-LINE MINING p 76

# IS YOUR COAL HAULING SYSTEM STRICTLY A "ONE WAY" STREET?

A.C.F. Mine Cars haul timbers, men and supplies into the mine on the identical cars that take the coal out! With the same locomotive, tracks, maintenance crew and equipment, A.C.F. 'Constant Haulage' mine cars handle both jobs for the price of one!

In addition, with mine cars, repairs don't mean shutdowns. If a mine car needs repairs, it goes off onto a siding... the rest of your trip continues to roll.

Whether you're planning a new haulage system or overhauling an old one, why not let an experienced A.C.F. Representative show you all of the tremendous advantages of A.C.F. 'Constant Haulage' mine cars?
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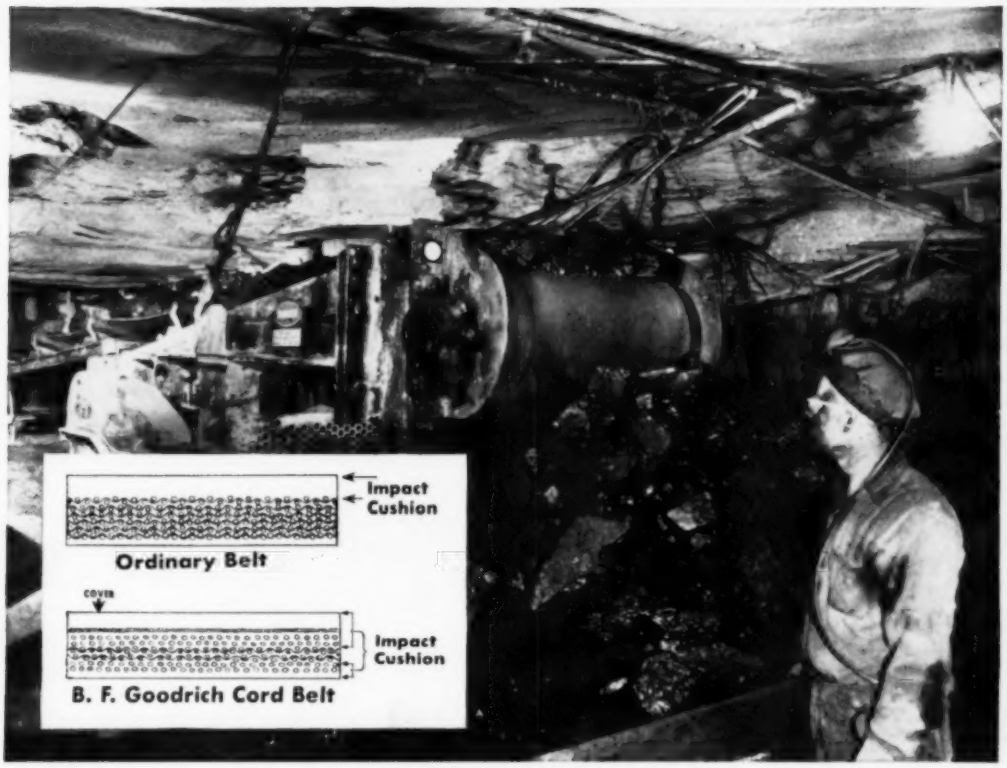
Chicago · St. Louis · Philadelphia · Washington · Cleveland
San Francisco · Huntington, W. Va. · Berwick, Pa.

**A.C.F. MINE CARS**

*for Constant Haulage*

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER




# How a B. F. Goodrich cord belt can haul coal "free of charge"

*Coal mine operators often get up to 50% longer belt life*

THE belt shown in the picture is a B. F. Goodrich cord belt over 10 years old. The mine operator's last report listed this belt as being "in fair condition." That's pretty good — especially when you consider other belts previously used lasted only about 7 years! On this basis, the BFG belt has been hauling coal "free" for several years.

***Cord belt stands more impact*** — Today's B. F. Goodrich cord belts will last even longer than before because of the new "balanced construction." This means that layers of individual cords are built into *both* the top and bottom of the belt to give greater impact resistance. Each of these lengthwise cords is completely surrounded by rubber — no cross threads tie them together. Cords are free to "give" when impact occurs. As an extra protection, B. F. Goodrich has added a patented *Transcord Breaker* — an extra layer of parallel cords in rubber, placed across belt width. Acts as a shock absorber, stretches to prevent gouges and cuts from splitting belt cover.

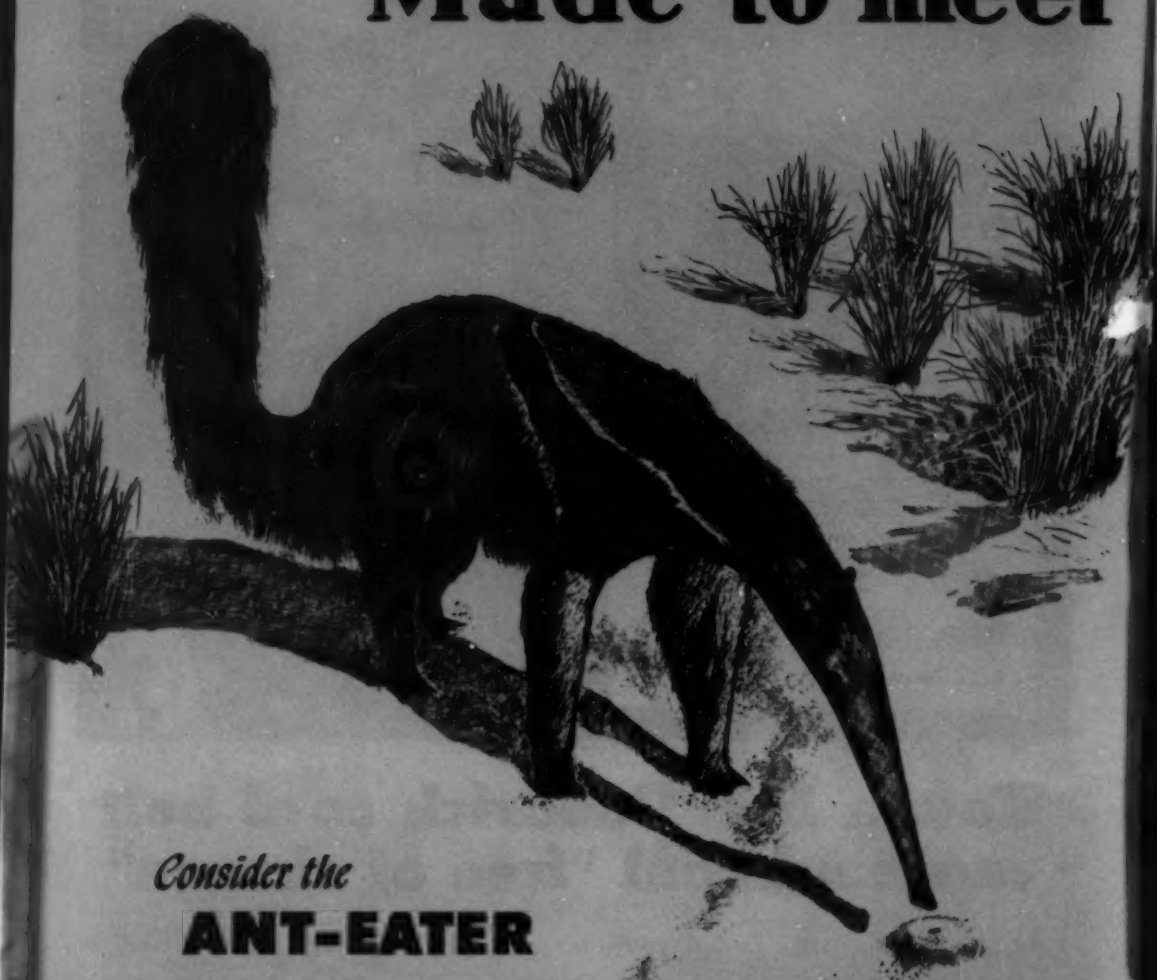
***Cord belt troughs better*** — There being no cross weave in cord plies, cords are free to flex. Belt conforms to idlers, pulleys. And with the new balanced construction, troughing is natural whether belt is empty, lightly or fully loaded. Spillage is reduced, belt keeps centered on idlers, sustains less damage, requires less maintenance. Longer centers, higher lifts can be used.

On the toughest coal-handling jobs, whether above ground or below, the B. F. Goodrich cord belt designed for coal-handling can do the job better, for less. Your local BFG distributor can show you how this belt can save you money, or write us direct: *The B. F. Goodrich Company, Industrial & General Products Division, Akron, Ohio.* (Available in Canada)

*Conveyor Belts* BY
**B.F.Goodrich**
RUBBER FOR INDUSTRY

*Successful because*

# Made to meet



*Consider the*

## ANT-EATER

Nature was mighty kind to the ant-eater. To enable him to satisfy his remarkable food preference, he got a long narrow snout, an extra-long tongue, enormous salivary glands . . . everything he needs to get the best results under difficult conditions.

**HULBURT OIL & GREASE COMPANY, PHILADELPHIA, PA.**

*Specialists in Coal Mine Lubrication*

# specific conditions

*now take coal mine lubrication . . .*

*The ONE RIGHT* ANSWER TO COAL MINING CONDITIONS *is*

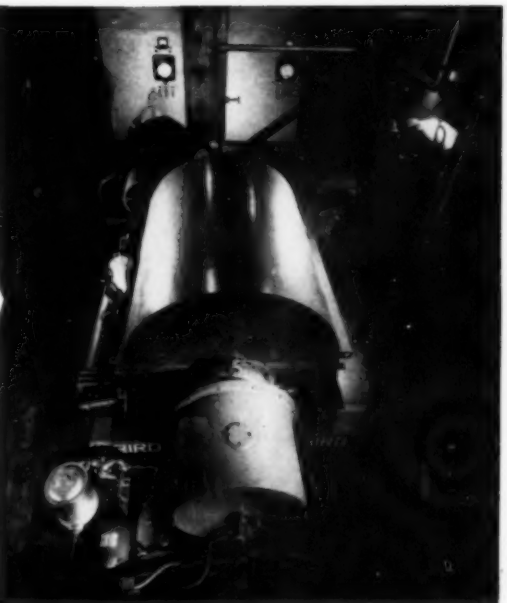
# Hulburt Quality GREASE

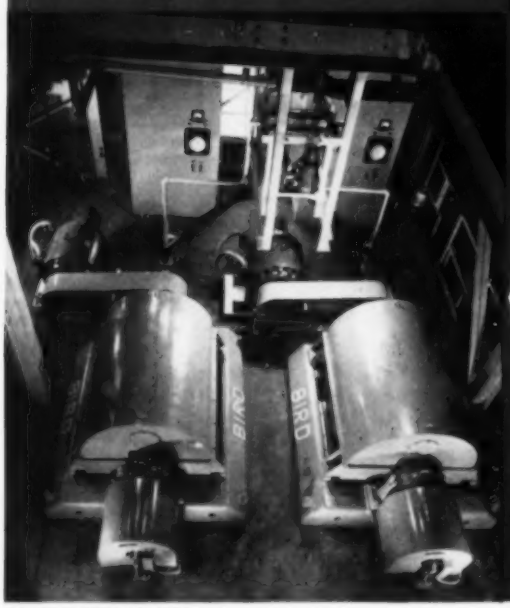
*"The Champion"*

**If you want your coal mining machines to run like they had ants-in-the-pants and eat up production records . . . use Hulburt Quality Grease! Because Hulburt Grease is the outstanding example of a specialized product made RIGHT for just one purpose—i.e. to lubricate coal mine machinery the right way. Conditions down in coal mines, we scarcely need remind YOU, are different than in any other industry. So Hulburt Quality Grease is made specifically to meet those conditions. So it does a better job. So use it.**

## THE BEST WAY TO GET THE COAL DRY

*This Bird Coal Filter* dewaters your fine coal after it has been washed. It gets it *dry* — dryer than any other mechanical method. It handles a ton a minute or more at seven cents or less per ton, counting power, labor, amortization and maintenance.






## THE BEST WAY TO GET THE WATER CLEAR

This Bird Polisher handles flocced, settled underflows, whisking out the slime-like fines and getting the circulating water completely clear. A closed circuit is thereby readily effected. There is no disposal problem, no more pollution headaches.

PHOTOS BY TORKEL KORLING

*For the facts and figures as they apply to your coal preparation requirements, get in touch with*

**BIRD MACHINE COMPANY**
SOUTH WALPOLE • MASSACHUSETTS

Coal Age

# JUNE • 1952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## *"Design for Modern Mining"*

### . . . COMING IN JULY

NEW MINING METHODS, equipment and ideas for top-efficiency low-cost coal mining will be appraised and analyzed in a big special issue of *Coal Age* appearing in July. In this special staff-prepared study, you'll have wrapped up in one package the most effective methods and equipment now in use, together with the best thinking of mining men and equipment makers on possible improvements in operating techniques. Here are a few of the topics the July *Coal Age* will cover:

#### DEEP MINING

Better mining and loading.
Safer roof support.
Faster, better face transportation.
Stepping-up main-haulage capacity.
Modernizing power systems.
Improving auxiliary services.
Longwall and continuous face mining.
Mechanizing pitching seams.
Auger mining and longhole drilling.

#### STRIP MINING

Improving overburden preparation.
Upping stripping and loading capacity.
Modernizing spoil haulage.
Adding coal-haulage capacity.
Bettering auxiliary services.
Extending coal-recovery range.

#### PREPARATION

How to use the best methods for both coarse- and fine-coal cleaning.
The latest methods of drying.
Modernizing sizing and loading.
Improving plant services.

***Be Sure You See July Coal Age***



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Cars lubricated with *Texaco Olympian Grease* start more easily and roll more smoothly all year 'round. No seasonal change is necessary. Thus, longer trains can be hauled, more tonnage moved. In addition, *Texaco Olympian Grease* assures longer bearing life and reduces maintenance costs.

The properties that make *Texaco Olympian Grease* superior to other greases are these: 1) extra-high resistance to oxidation; 2) freedom from separation whether in use or in storage; 3) ability to stay in the bearings for longer-than-ordinary periods; and 4) ability to act as effective seal against dirt and moisture. *Texaco Olympian Grease* is available in three consistencies to meet all requirements of plain, cavity hub or anti-friction bearings.

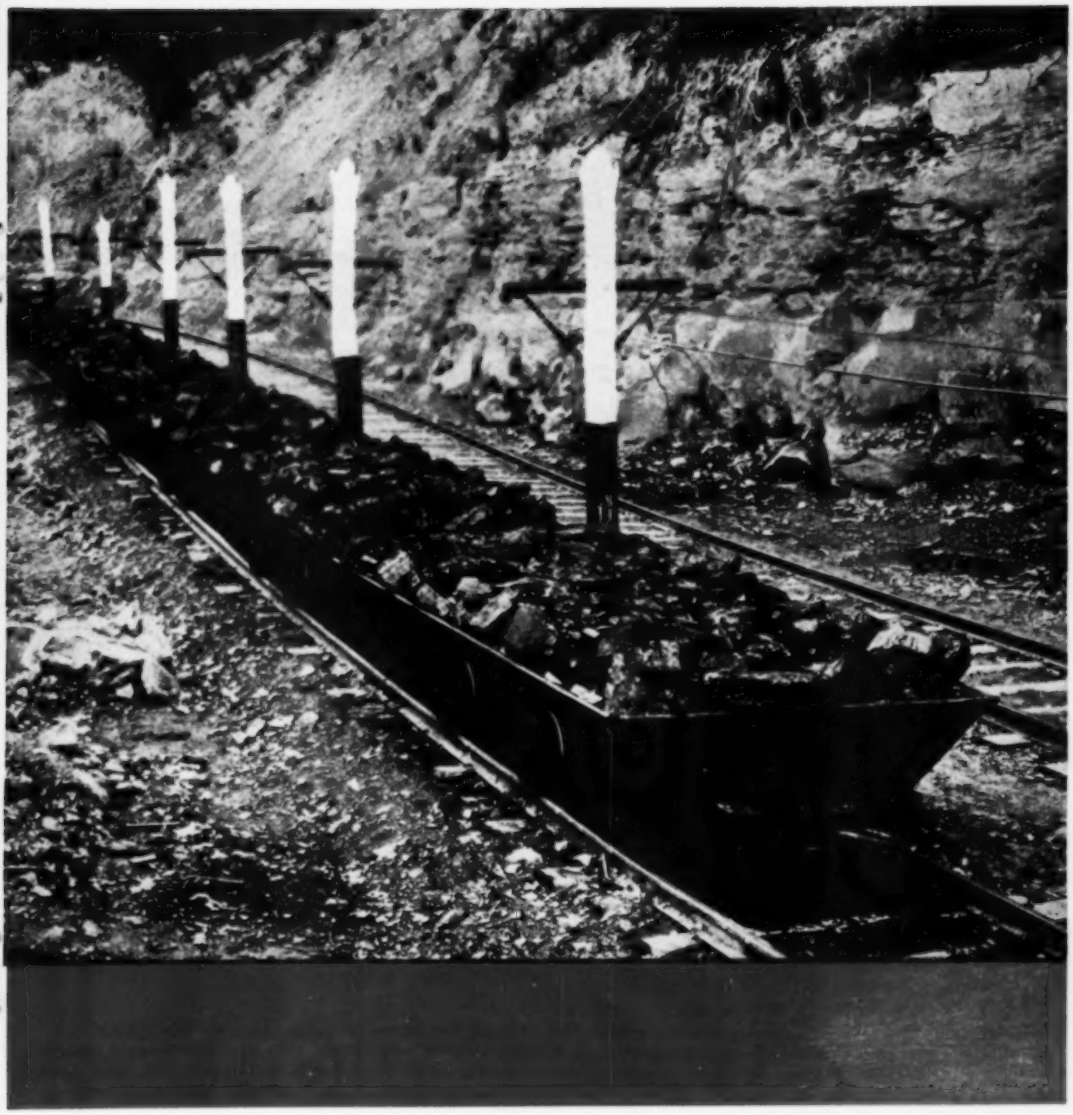
For high speed, grease lubricated ball and roller bearings, use *Texaco Regal Starfak* — the premium-quality lubricant that outperforms ordinary greases. Assures longer lasting protection against wear and rust... reduces your maintenance costs.

A Texaco Lubrication Engineer will gladly help you use effective lubrication to improve efficiency and reduce costs throughout your mine. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

**TUNE IN . . . TEXACO STAR THEATER** starring **MILTON BERLE** on television every Tuesday night. See newspaper for time and station.

TEXACO

**TEXACO LUBRICANTS**



# For the Coal Mining Industry

*Faithfully yours*

50 for Fifty Years

# TORQUE CONVERTER

Adding a torque converter, electric shift, and electric steer control, to 19 m.p.h. Tournadozer is another development to help you move dirt faster and at lower costs. With these additional features Tournadozer becomes an even greater producer on high-speed pushing, pulling and dozing assignments. The single-stage torque converter is a simple, trouble-free type, which combines the advantages of a hydraulic torque converter and a fluid coupling. Teamed with the constant mesh transmission, it provides an infinite speed range from 0 to 19 m.p.h., and automatically selects the proper ratio for delivering maximum power in a steady, even flow to Tournadozer's wheels. This enables the engine to operate at maximum r.p.m. and at highest efficiency. Torque converter absorbs practically all shock-loads between engine and drive wheels . . . adds efficiency . . . means more work done dozing, climbing grades, pulling through mud, snow, ice, sand. It improves performance in any type of difficult operation, increases accuracy in holding cuts to grade and in close finishing.

Combining low-pressure, 21.00 x 25 rubber tires and constant-mesh transmission with torque converter, Tournadozer gives you the smoothest running dozer you've ever seen! You get instant speed selection at the touch of an electric switch . . . no delay . . . no de-clutching or loss of vital momentum for shifting gears.

Wheel speeds are automatically adjusted to give you maximum power delivery in gear range selected, thus eliminating shock loads or need for frequent gear change. With 4 forward speeds, 2 reverse, plus torque converter, you get an infinite speed range with most effective use of power over every foot of the way. This constant, smooth power, always available contributes to increased output plus lower maintenance and longer machine life.

Check all the advantages you get from new torque converter, plus the new electric shift and steer control, which combine to make Tournadozer by far the fastest, most efficient dozer money can buy. It will pay you to contact your LeTourneau Distributor . . . he'll be glad to show you how these advantages help Tournadozer to do more work on all your jobs per hour . . . per day . . . per year.

LETOURNEAU LET EQUIPMENT

**HIGH-SPEED, RUBBER-TIRED EXCAVATING • HAULING • LIFTING EQUIPMENT**

# makes TOURNADOZER even greater producer

## TORQUE CONVERTER gives you all these advantages

**1 Smooth acceleration**—infinite speed range 0 to 19 m.p.h., more work done on the level, up steep grades, or in soft going.

**2 Better traction**—steady pull of smooth flowing power gives big, low-pressure tires a firmer grip in tough footings to pick up and carry bigger loads without slippage.

**3 Longer tire life**— peak loads in tire acceleration are eliminated, giving better wear, longer, more economical service.

**4 No shock or vibration** — shock loads of sudden speed increases are absorbed in oil of torque converter and eliminated from transmission and entire power train.

**5 Higher engine efficiency**— constant horsepower cuts down engine wear . . . eliminates lugging . . . reduces maintenance expense . . . adds to engine life.

**6 Steady engine speed**—assures maximum voltage to electrical equipment . . . improves service and life of engine attachments.

**7 Accurate grading** — smooth, perfect balance of torque against load gives accurate control of blade at all times.

**8 Single-stage torque converter** — simple and trouble-free . . . not dependent on seal efficiency for converter efficiency.

**9 Easier operation**—smoother performance throughout cycle increases operator efficiency . . . boosts your production.

**10 More yards per hour**—use of maximum engine horsepower gives higher average speed, higher ratio of operating efficiency, more work done.

**Check additional attachments available below**

Tournadozer—Trademark Reg. U. S. Pat. Off. D-14-G-4

**Down pressure blade** (optional) — now available, assures quick positive penetration in wet frozen sand, clay, hardpan, other hard materials. Electrically-operated PCU, plus short-coupled cable gives fast, smooth blade control.

**Angledozer**—simplifies side-hill work. 13' x 41½" blade can be angled 20° right or left, is easily interchanged with standard bulldozer. Optional electric motor tilts either corner of blade 10" for digging with blade point.

**Snow plow**—has 12' 3" clearing width, flows snow 6½' high off ends of V-type plowshare blade. When not needed for clearing haul roads or floor pit, can readily be rented to counties or cities for street and highway plowing.

**R. G. LeTOURNEAU, INC.**

PEORIA, ILLINOIS

Front view shows high-voltage receptacle. Door to low-voltage breakers is shown on the side.

Back view shows the four low-voltage receptacles.

# LOW-COST MINE POWER CENTER

Here's the low-cost way of carrying high-voltage power to the vicinity of the working face . . . to take full advantage of better regulation, lower line losses. It's the new Westinghouse Power Center, designed for service where nonhazardous conditions exist. One complete package, the unit is contained in a sheet steel case. Because of its economical construction and natural draft air cooling . . . *it costs much less than a totally-sealed unit.*

Small, compact size makes it ideal for lowering into mine shafts. The largest rating, 300 kva, is only 26″ high and 45″ wide. For easy portability, it is mounted on skids and equipped with pulling eyes. A separate dolly with adjustable wheels is available for track haulage.

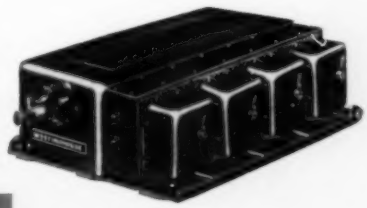
*Other important advantages are:*

1. Flexibility of voltages . . . from 2400 to 4160 on the primary and 120 to 480 on secondary.
2. Complete and separate protection for each outgoing feeder.
3. Fast disconnection and reconnection of feeders.
4. Safety . . . ground-protective system opens the affected breaker if ground fault occurs.

For complete information contact your nearest Westinghouse representative, or write for Booklet B-4428, Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-70604

***FOR HAZARDOUS CONDITIONS . . .***
***The Safest Power Center You Can Put in a Mine***

This dry-type power center is totally explosion-proof. Comes with basic class C insulation, bonded with silicone . . . core and coils hermetically-sealed in an atmosphere of dry nitrogen.



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Westinghouse
TRANSFORMER EQUIPMENT

# ANNOUNCING

## THE IMPROVED

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NOW COMES ANOTHER Exide-Ironclad advance . . . . . a polyethylene insulating tube sealer. This and other improvements combine to give you more dependable battery performance and longer-than-ever battery life.

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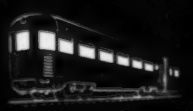
. . . AT ANY PRICE



# BUILT TO GIVE YOU...

**RAPID ACCURATE HANDLING . . . UNIFORM RATE OF HANDLING... HIGH AVAILABILITY... LOW OPERATING COSTS... LOW MAINTENANCE COSTS... LOW DEPRECIATION COSTS... HIGH MANEUVERABILITY... SAFE HANDLING**

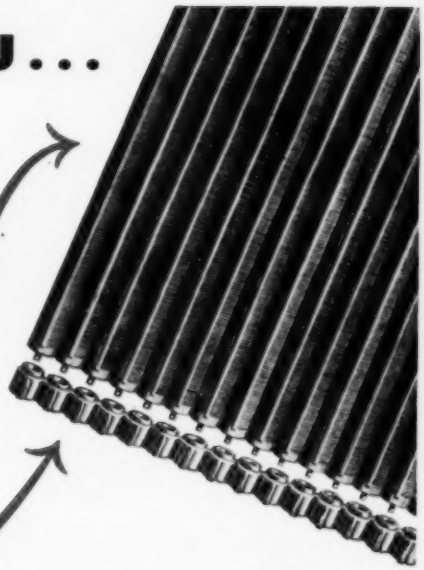
## BECAUSE OF:

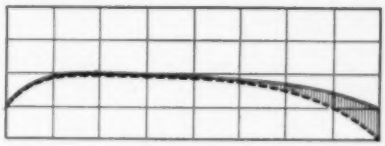
IMPROVED POSITIVE PLATE CONSTRUCTION

the long-life grids now contain SILVIUM —an alloy of silver, lead and other components—which make them highly corrosion resistant. Top conducting bar is heavier.

...with the New Polyethylene insulating tube sealer

An insulating sealer for the bottom of the tubes. Acid-proof, non-corroding plastic it fits snugly into slotted tubes of positive plate, and reduces loss of active material. Even the small sediment deposit of the past is reduced 50%. Thus, more active material remains available, and the high battery capacity is sustained for longer working life. (See chart at right.)





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Improved processing, a result of Exide Quality Control assures uniform plates with higher electrical efficiency. These negatives, teamed with the improved positive plates, give you a well-balanced combination for hard service and long life.

**NEW SEALING COMPOUND**

Through the cooperative efforts of Exide Laboratories and the Franklin Institute, a new homogeneous compound was developed. It makes a permanent seal between the jar and cover, resisting shock without cracking in high or low temperatures.

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Made of high quality rubber. A scientifically selected combination of tensile strength and elongation provides a sturdy jar built for long life and heavy-duty service.

**CORROSION-RESISTANT TRAY GUARD**

A plastic acid-resistant steel tray coating with high insulating quality and ability to withstand hard knocks.

**NEW UNBREAKABLE PLASTIC VENT PLUGS**

Made of unbreakable polyethylene. Can be quickly and easily removed to add water.

Types and sizes for storage battery applications for every heavy-duty service.

*Write today for further information.*

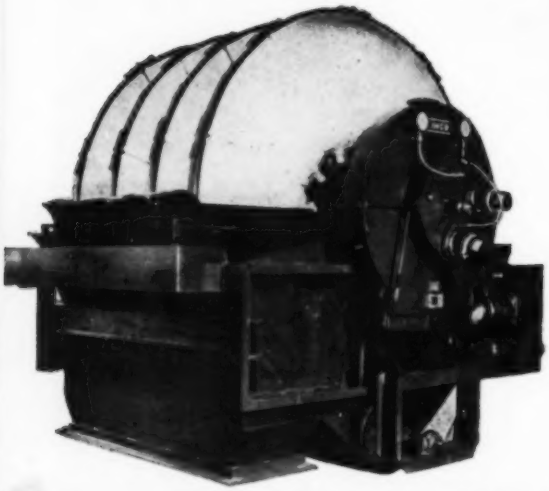
**THE ELECTRIC STORAGE BATTERY COMPANY**

**Philadelphia 2**

***Exide Batteries of Canada, Limited, Toronto***

"EXIDE-IRONCLAD" and "PERMANIZED" *Reg. Trade-marks U.S. Pat. Off.* "SILVIUM" *T.M. Reg. applied for*

# Putting Coal Fines on the Profit Side of the Ledger

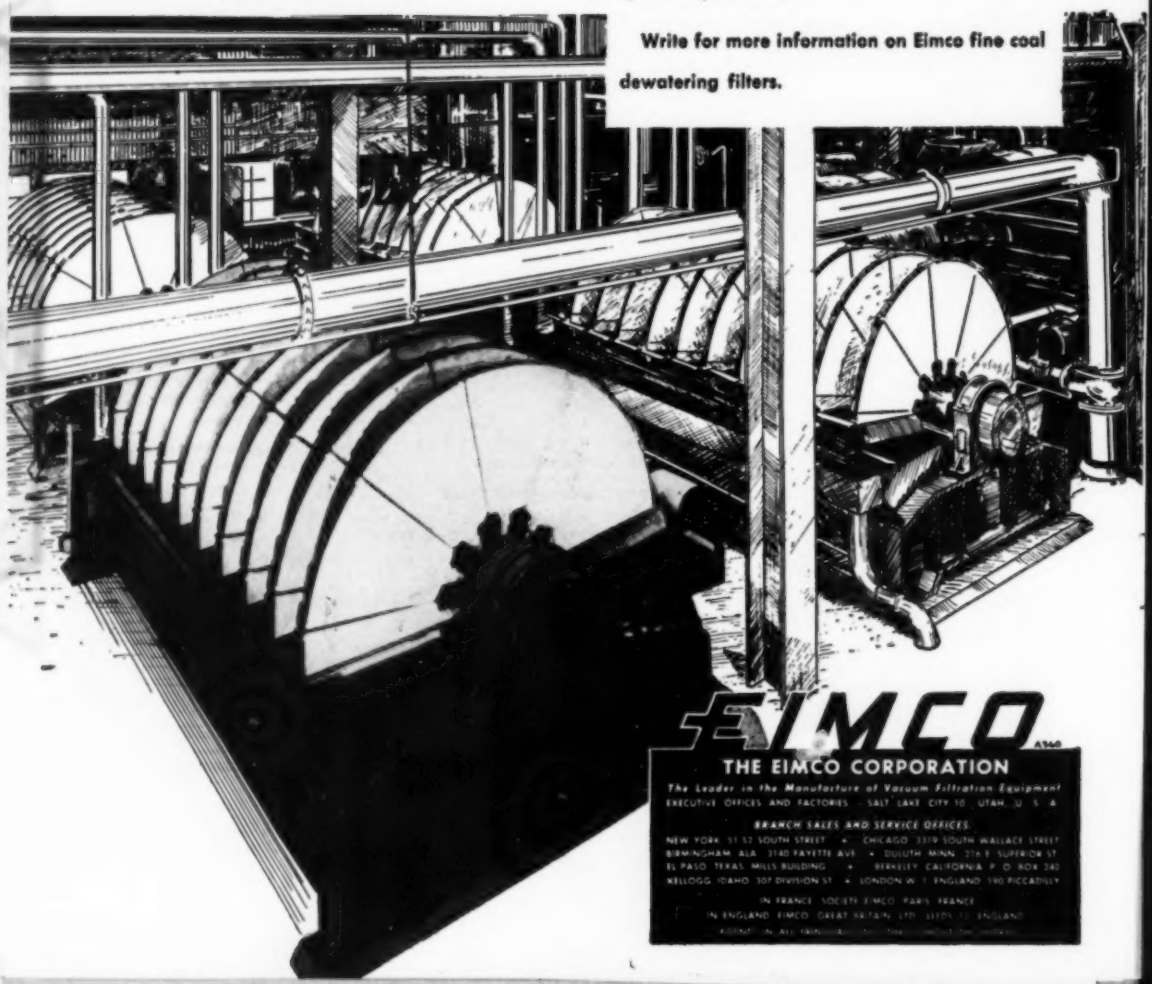


**Valuable Coal Fines are being dewatered on Eimco Filters and sold at a profit in many places where they were regarded as waste.**

**A clear water discharge from your Eimco filter means that every bit of coal cut and delivered to the washer is bringing its share of revenue.**

**Eimco Agidisc filters offer many advantages over other types of dewatering equipment, such as: low initial investment, lower moisture content in the coal cake, even drying, greater tonnage per square foot, per hour and small floor space requirement.**

**Write for more information on Eimco fine coal dewatering filters.**



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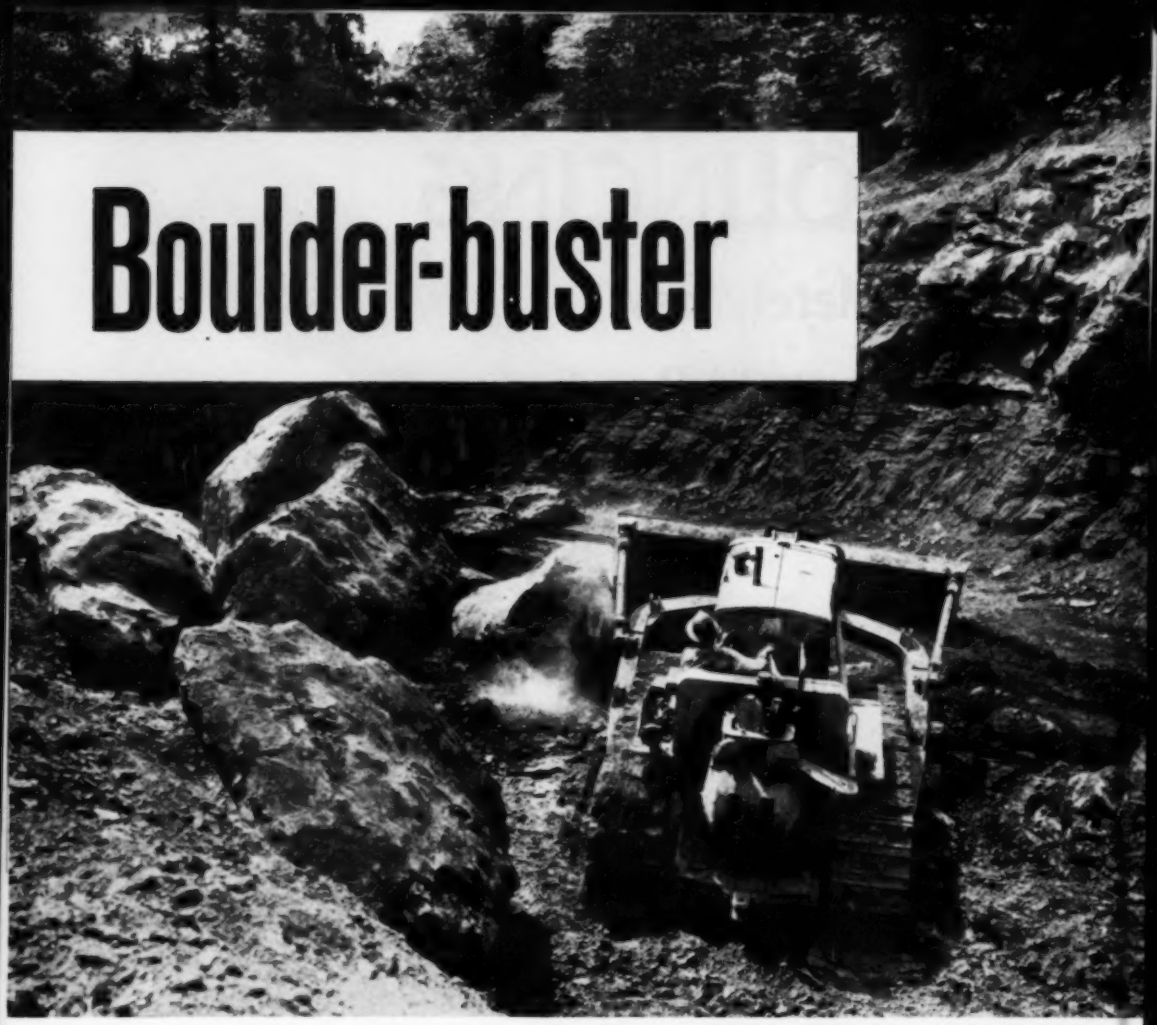
# Boulder-buster



*This "Caterpillar" D8 Tractor and No. 8A Bulldozer are 'dozing heavy rock from the shelf so that drill rigs can be moved in for blasting.*

If you want to slug it out with really big rock, there's one machine you know you can count on. A "Caterpillar" D8 'Dozer is built to stand up to the job.

There's rocky overburden in the Vogue Coal Co. mine, at Madisonville, Kentucky. Boulders nearly as big as the tractor itself have to be moved constantly. This "Cat" D8 Tractor, equipped with a No. 8A "Caterpillar" Bulldozer, has worked almost 5,000 hours under such conditions as you see in the photograph. And the only thing that's been done to it was to have the valves ground once. Tough? That tractor and its big steel blade are a rugged team!

Superintendent A. H. Robertson says: "All our track-type tractors in this mine are 'Caterpillar'-built. We wouldn't have anything else."

Good equipment is worth taking care of, in these times when it has to last. A few minutes a day spent on proper maintenance will pay off in many added hours of profitable work life. Consult your "Caterpillar" Dealer. He's there to help you with all the fine service facilities at his disposal.

**CATERPILLAR,** PEORIA, ILLINOIS

**CATERPILLAR**

REG. U. S. PAT. OFF.

DIESEL ENGINES
TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

# ANNOUNCING

## a completely new Tigerweld Bond

☆ holds itself in position while you weld

☆ new design allows maximum welding area

●Now, you can have easy application *and* low installed resistance—with the new Tigerweld BF-12 power bond.

With a couple of hammer blows, you can drive the BF-12 firmly onto the track. It lines up perfectly and holds tight while you make the weld. The new terminal contour allows you to lay a heavy bead between the track and terminal. The result is a high strength, long life bond with very low joint resistance.

Remember also that the strand is actually *buttwelded* to the terminal. This eliminates mechanical injury and overheated strands. Every wire in the strand is permanently attached to the steel terminal. This joint is even stronger than the strand itself!

Next time you order, specify the new Tigerweld BF-12 Rail Bond. We think it's the best bond on the market today.

**AMERICAN STEEL & WIRE DIVISION**
**UNITED STATES STEEL COMPANY, GENERAL OFFICES, CLEVELAND, OHIO**

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

## U·S·S Tigerweld Rail Bonds

**UNITED STATES STEEL**

# A "NATURAL"

*for*

# ALUMINUM CABLE

If your plans call for the installation of aluminum cables on the basis of copper size, we would like to suggest that you consider the following point. Aluminum will heat to a greater extent than copper when the same amount of current is put through the cable.

So instead of using conventional insulations, which are seldom rated more than 140 F. (60 C.), specify Simplex-Anhydrex XX insulation. This will help overcome the heat problem because Anhydrex XX is rated at 176 F. (80 C.).

Simplex - Anhydrex XX insulation will operate at temperatures up to 176 F. (80 C.) in either wet or dry locations at voltages up to 17,000.

If you must use aluminum because of the copper shortage, let our engineers help you with your problem.

We would be more than happy to give you the latest specification data on Simplex-Anhydrex XX insulation. Simply send your request to the address shown below.

Simplex-Anhydrex XX is a product of Simplex Research.

**SIMPLEX-ANHYDREX XX**

SIMPLEX WIRE & CABLE CO.
79 Sidney St., Cambridge 39, Mass.

# Here's the Big Difference!

## TAPER-LOCK

*–The Sheave that always runs true!*

The Taper-Lock bushing seats evenly along the entire length of the hub. It is self-seating. There is no collar—no protruding part—no flange to prevent uniform compression.

With full contact, Taper-Lock sheaves run true. Made of finest grade of close-grained semi-steel, cast in the Dodge foundry. Precision grooves have identical pitch diameters so that every belt can pull its share of the load.

Sheave and bushing mount as a unit—easy to align on the shaft. Grips the shaft like a shrunk-on fit. Flush hub means safety.

THERE IS ONLY ONE TAPER-LOCK (a patented product of Dodge). Available from distributors' stocks in a complete range of sizes in A-B combination, B, C and D grooves. Also ask your distributors for Dodge Sealed-Life V-Belts. WRITE for complete data.

DODGE MANUFACTURING CORPORATION, 3000 Union St., Mishawaka, Indiana

**DODGE**

*of Mishawaka, Ind.*

**CALL THE TRANSMISSIONEER**

your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified phone book.

**The reliable machine you see everywhere... Work-horse of the medium thin veins!**

# JOY 14-BU LOADER

In medium vein mining—36″ to 60″—*more coal is loaded by JOY 14-BU's than all other loaders combined.* Unmatched durability, through advanced, simplified design, has made the 14-BU the world's most widely used loader. There are less than *one-third* as many wearing parts, and only *half* as many points of lubrication, as on comparable machines.

Breakage of the gathering mechanism, or any failure other than by normal wear, is virtually unknown on the 14-BU. The rigid design of the gathering head provides a compact and very strong construction. "Tight" shots and corners can be loaded out quickly and easily without fear of damaging the loader.

Because of the long tread-to-length ratio, which reduces pitching while tramming, the 14-BU requires minimum roof clearance on rolling bottom. Exclusive Magnetax control permits easy, positive, one-man operation. The rear roller-shaft is considerably oversize, to combat tail-conveyor damage. Like all assemblies of the 14-BU, it is readily accessible for easy maintenance.

The Joy 14-BU is produced in heights of 30½″, 33″, or 36″, and will load up to 8 tons a minute. ● Let us show you how JOY Loaders and other mining equipment can increase *your* production and profits—no matter what your conditions may be.

*Consult a Joy Engineer*

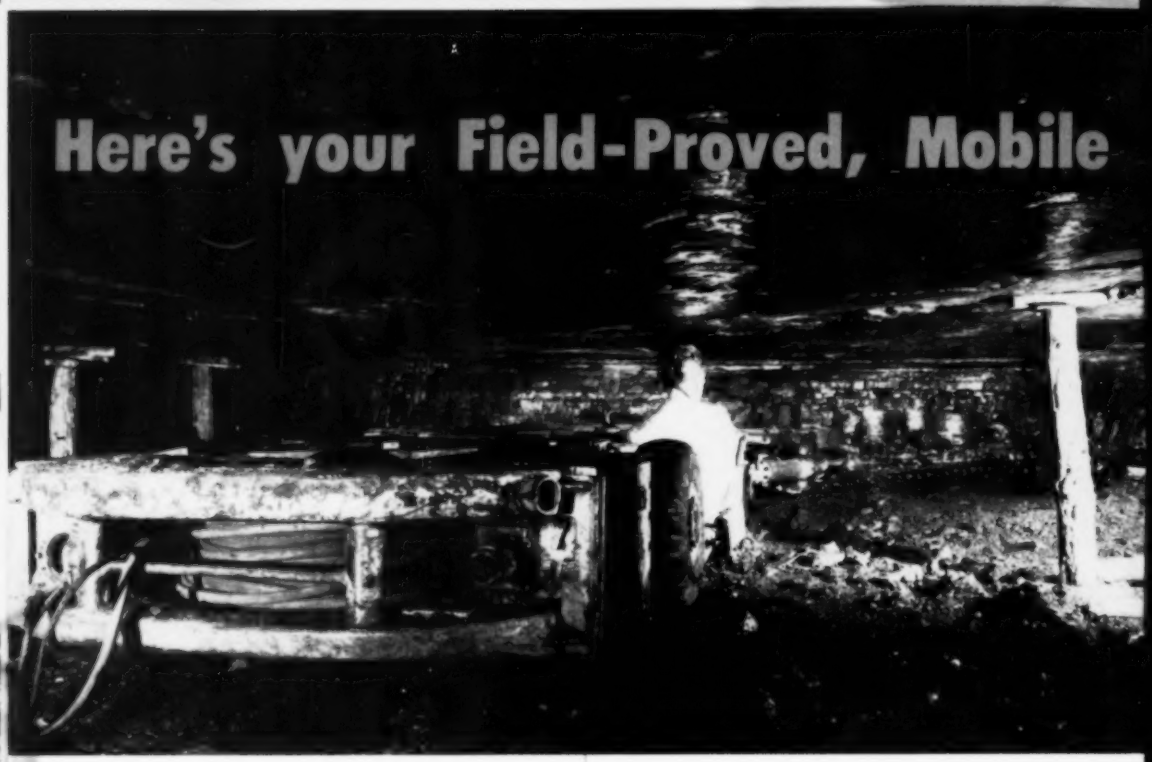
W&D CL 3992

## JOY MANUFACTURING COMPANY

**GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.**

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

# Here's your Field-Proved, Mobile



## 20-BU-1 LOADER

Only 24" high, yet can load up to 8 tons per minute. Fast tramming, easily maneuverable, features independently driven conveyor and gathering head. While a shuttle car is away, the gathering arms can provide a fully-loaded conveyor ready for quick loading when the car returns. Also permits continued loading even if the gathering arms are momentarily stalled with hard digging.

## 8-SC SHUTTLE CAR

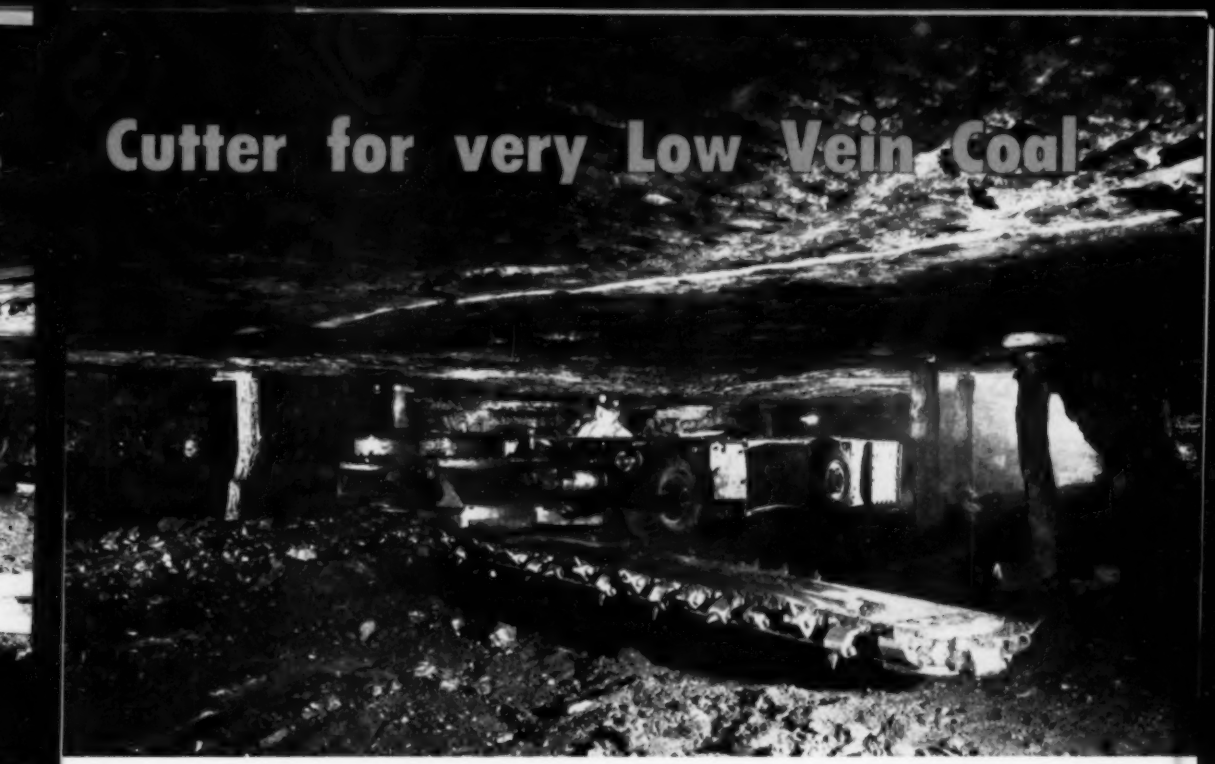
Features 4-wheel positive drive, 4-wheel hydraulic steering, tapered-end design for minimum turning clearance, height of only 26" and level capacity of 2 tons. Separate motors for traction, conveyor drive, and hydraulic pump drive. Disc-type brakes on all wheels, hydraulic cable reel and hydraulically-adjustable elevating discharge.

*and here's the rest of the* **JOY**

# LOW VEIN TEAM

## SULMET CARBIDE BITS

Joy Sulmet Bits, tipped with sintered tungsten carbide inserts, are made in a variety of types and different degrees of hardness to meet any mining condition. They fit any cutter, and by actual case records, out-perform every other bit on the market.




# The JOY 12-RB CUTTER

## FAST TRAMMING, FAST CUTTING for HIGH PRODUCTION

Meet the JOY 12-RB, above . . . the cutter member of the *only* mechanized mining team designed specifically for high-capacity production in very low vein coal. With the Joy 20-BU-1 Loader and 8-SC Shuttle Car, it assures field-proved flexibility and economy never before available to mines operating in extremely thin seams.

The 12-RB is a highly mobile and maneuverable rubber-tired cutting machine only 26" high, supplied either as a top or bottom cutter, and readily convertible. Its high tramming speed and variable hydraulic feed (which provides a greater cutting feed speed than shortwall machines) together permit cutting more places per shift. Bar tilt, roll and lift are hydraulically controlled, and steering is also hydraulic, with a separate motor serving the hydraulic pump.

**Have you seen this film?**

**"TRACKLESS MINING IN COAL"**

**16MM—Sound and Full Color—45 Minutes**

*Write for a FREE Showing*

**Address our Film Booking Office**

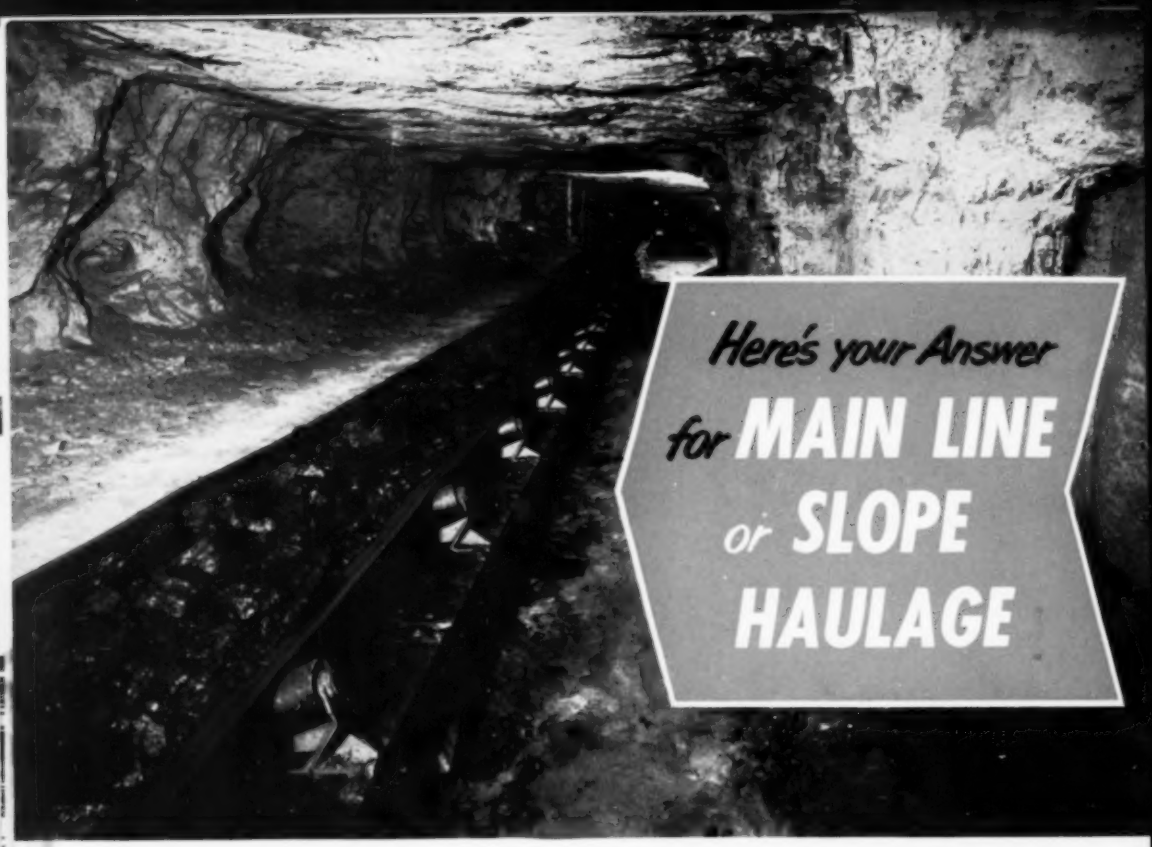
*Consult a Joy Engineer*

W&D CL-4001

**JOY MANUFACTURING COMPANY**

**GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.**

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO




# JOY BELT CONVEYORS

*Complete Range from 26" to 48", featuring:*

**Heavy, rugged construction for Main Line or Slope work . . . Field-proved dependability and low maintenance . . . Special "knockdown" frame design for easy portability in low coal.**

For maximum reliability in the vital job of main line or slope haulage, JOY Belt Conveyors are your proved best bet. They employ heavy, pan-type sections, bolted together for extreme rigidity and available in 8′, 9′, 10′ or 12′ lengths—with various idler spacings depending upon the requirements of the job, and with 4″, 5″ or 6″ dia. rolls. The idler rolls are available either with heavy duty, sealed-for-life ball bearings, requiring no attention, or with heavy duty, grease-type tapered roller bearings, as desired. ● For *any* mine conveyor need—belt, chain or shaker—let us show you how a JOY unit will do the job best, and at lowest overall cost per ton.

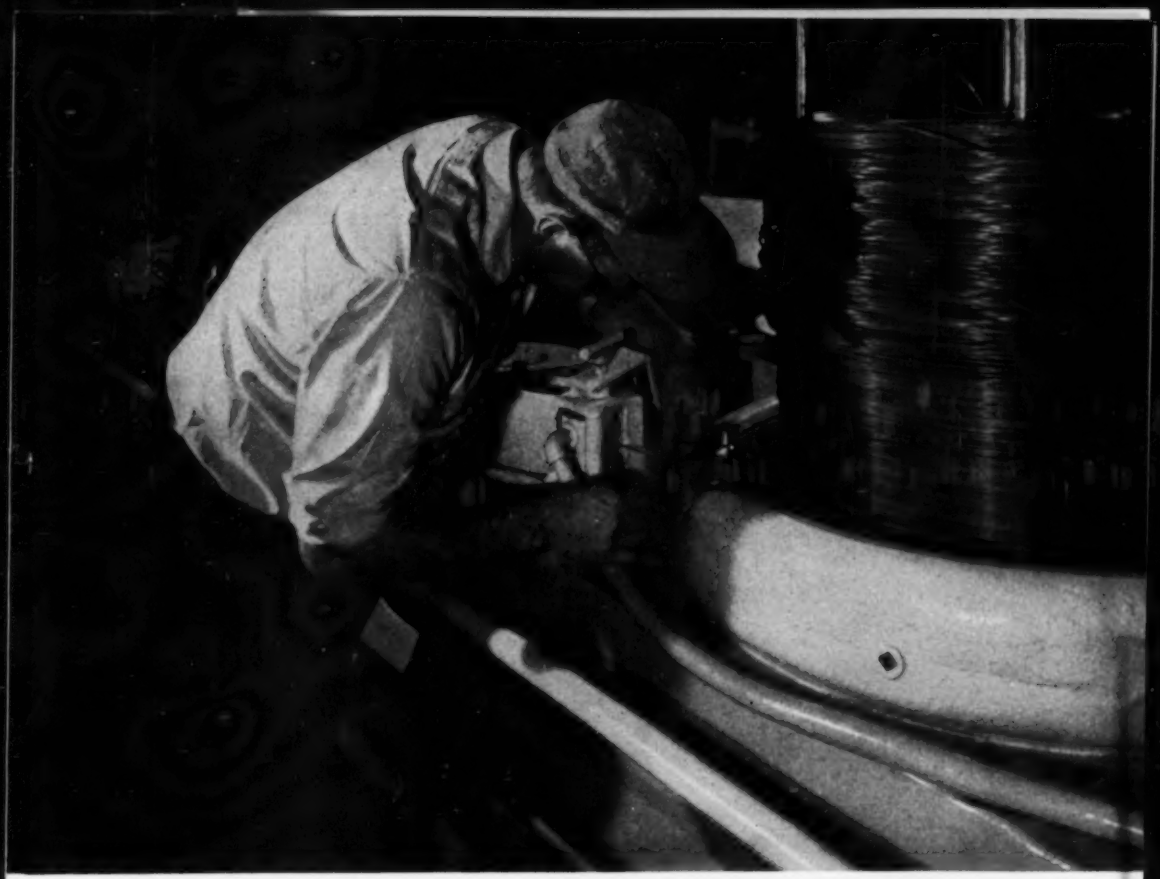
*Consult a Joy Engineer*

W & D CL 3980

## JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO



This modern machine is next to infallible—yet even so, the Bethlehem operator checks the reduction of his wire.

# His attention to detail means better rope for you

Wire-drawing is a fundamental step in the making of Bethlehem rope, and it's done on machines that almost never make mistakes. Nevertheless, this operator, like others in the Bethlehem mill, runs frequent checks on the work going through. He wants to be sure that his part of the job meets the specified standards—which are very, very high.

This care, this attention to detail, is not confined merely to the drawing of wire. It begins with the making of the steel used in Bethlehem wire rope, and it carries through each and every step to the final inspection and reeling.

Care is a lot of *little* things which, taken together, mean a quality product. It is one of the reasons why you cannot buy a better rope than Bethlehem makes.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

*On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation*

***When you think WIRE ROPE . . . think BETHLEHEM***

# "Carlon* won't corrode!"

**"Take a look at the difference in these two sections of pipe. The metal pipe has been in service only two weeks and is already rusted out by the corrosive waters in this mine. The piece of CARLON plastic pipe is from an installation that's served over four years without repair or maintenance. It's just as good as new because CARLON *won't corrode!*"**

**Only CARLON plastic pipe** is guaranteed against rot, rust and electrolytic corrosion. It is impervious to the chemical attack of sulphurous waters, alkalies, metallic salts and other corrosive wastes. Smooth internal surface will not accumulate scale or sediment.

**Flexible, lightweight CARLON** can be installed quickly without special tools or rigging equipment.

It is furnished in long lengths which require fewer fittings. Connections can be made quickly with molded plastic fittings.

| NOM. SIZE | O.D. | I.D. | EST. BURST P.S.I. | WT. LBS. PER FT. | SHPG. LENGTHS |
|---|---|---|---|---|---|
| ½" | 0.840 | 0.622 | 540 | 0.103 | 400 ft. coils |
| ¾" | 1.050 | 0.824 | 350 | 0.140 | 400 ft. coils |
| 1" | 1.310 | 1.070 | 200 | 0.181 | 300 ft. coils |
| 1¼" | 1.660 | 1.380 | 200 | 0.267 | 300 ft. coils |
| 1½" | 1.900 | 1.610 | 200 | 0.320 | 250 ft. coils |
| 2" | 2.378 | 2.070 | 170 | 0.445 | 200 ft. coils |
| 2½" | 2.875 | 2.469 | 170 | 0.680 | 200 ft. coils |
| 3" | 3.504 | 3.070 | 165 | 0.910 | 100 ft. coils |
| 4" | 4.504 | 4.030 | 150 | 1.250 | 25 ft. str. |
| 6" | 6.630 | 6.070 | 115 | 2.230 | 25 ft. str. |

Identification Stripe: WHITE—Standard Pipe
RED—Heavy-duty Pipe

CARLON CP SSI-CP

*Specify the Pipe with the Stripe!*

**Write for catalogs**

## CARLON PRODUCTS CORPORATION

*In Canada: Micro Plastics, Ltd., Acton, Ontario*
**10300 Meech Avenue • Cleveland 5, Ohio**

# You save 12 ways

## with Goodyear's Coal-Flo Conveyors

1. Coal-Flo conveyor haulage eliminates tracks, switches, bonding, heavy grading; operates efficiently over pitches and rolls without jamming or mashing coal.

2. Cuts timbering cost up to 50%. Belt runs close to rib, enabling you to use a single prop under the center of the roof-load and insure far greater safety with much less timber.

3. Up to 20% more lumps from low seams, due to greater clearance between belt and roof, plus gentler handling.

4. No danger of runaways with peril to "hot-footers." Haulage injuries are virtually unknown.

5. Far greater ton-per-hour capacity because haulage is continuous—you lose no time to car spotting—keep cutters and loaders going without time out.

6. Greater safety from fire and explosion through elimination of bare wires, charged coils, sparks and broken cables.

7. Far less brushing—you leave your gob inside even in low-seam coal because Coal-Flo belts require minimum headroom.

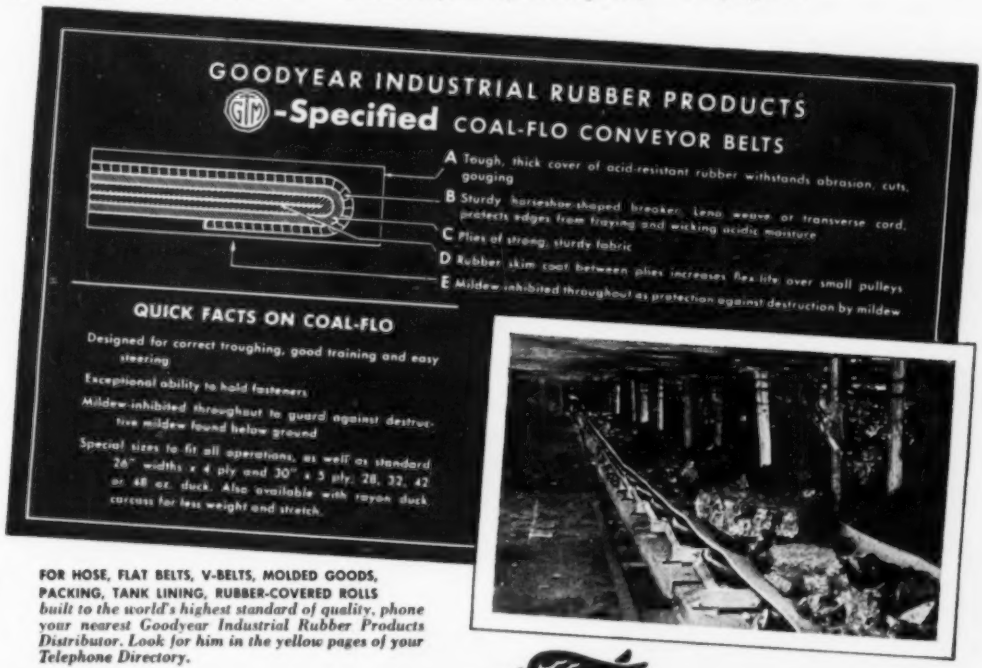
8. From 50% to 75% lower power, maintenance and operating cost—you need no haulage crews with Coal-Flo belts.

9. Silent operation lets you hear a "working" roof.

10. Fewer roof falls because of safer timbering and vibration-free operation.

11. More uniform power demand—no surges, peaks and valleys that occur with intermittent operation. You get better voltage regulation.

12. Continuous, uniform, automatic delivery at the tipple; you need no dumping crew.


GOODYEAR INDUSTRIAL RUBBER PRODUCTS
-Specified COAL-FLO CONVEYOR BELTS
A Tough, thick cover of acid-resistant rubber withstands abrasion, cuts, gouging
B Sturdy horseshoe-shaped breaker, Leno weave or transverse cord, protects edges from fraying and wicking acidic moisture
C Plies of strong, sturdy fabric
D Rubber skim coat between plies increases flex-life over small pulleys
E Mildew-inhibited throughout as protection against destruction by mildew
QUICK FACTS ON COAL-FLO
Designed for correct troughing, good training and easy steering
Exceptional ability to hold fasteners
Mildew-inhibited throughout to guard against destructive mildew found below ground
Special sizes to fit all operations, as well as standard 26" widths x 4 ply and 30" x 5 ply; 28, 32, 42 or 48 oz. duck. Also available with rayon duck carcass for less weight and stretch.

**FOR HOSE, FLAT BELTS, V-BELTS, MOLDED GOODS, PACKING, TANK LINING, RUBBER-COVERED ROLLS**
*built to the world's highest standard of quality, phone your nearest Goodyear Industrial Rubber Products Distributor. Look for him in the yellow pages of your Telephone Directory.*

# GOODYEAR

## THE GREATEST NAME IN RUBBER

*We think you'll like "THE GREATEST STORY EVER TOLD"—Every Sunday—ABC Network*

Coal-Flo—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

# Just count 'em!

**Count the number** of Internationals you see next time you're on the highway.

Why? Because you'll learn this very simple truth: professionals in the hauling business use more heavy-duty Internationals than any other make of truck. They're engineered to do the job.

The reason for the professionals' preference is that Internationals give them lower operating and maintenance costs, longer truck life. Why not see your International Truck Dealer or Branch and let him show you how he can give you these truck values on your job? Do it soon.

**INTERNATIONAL HARVESTER COMPANY · CHICAGO**

**Only International's give you:**

- All-truck engines—exclusively for truck work—built in the world's largest truck engine plant.
- The "roomiest, most comfortable cab on the road"—the Comfo-Vision Cab designed by drivers for drivers.
- Super-steering system—more positive control, easier handling and 37° turning angle.
- Traditional truck toughness that has kept International first in heavy-duty truck sales for 20 straight years.
- Extra heavy-duty specialization—includes engines, transmissions, axles, springs, frames, etc. . . . engineered for your job to save you money.
- America's largest exclusive truck service organization.

International Harvester Builds McCormick Farm Equipment and Farmall Tractors . . . Motor Trucks . . . Industrial Power . . . Refrigerators and Freezers

## INTERNATIONAL TRUCKS

*"Standard of the Highway"*

International LF-210 series offers GVW ratings from 37,000 to 45,000 lbs., wheelbases 157 to 175 inches.

# Cut Maintenance Costs ...with Accessibility Like This!

## ALLIS-CHALMERS Coal Washing Pump

**ONLY 5 WEARING PARTS**

Shaft sleeve, impeller casing, two wear plates. All easy to handle and easy to replace.

EVERYTHING YOU NEED TO REMOVE or adjust when servicing the Allis-Chalmers CW Pump is easy to reach and easy to replace. The packing gland nuts are wide open so you can get a wrench on them. The clear water seal piping is easy to install and the flow is easy to adjust. If you want to remove the rotating element, the casing bolts need only be loosened slightly and pulled out of their slots. Piping is not disturbed.

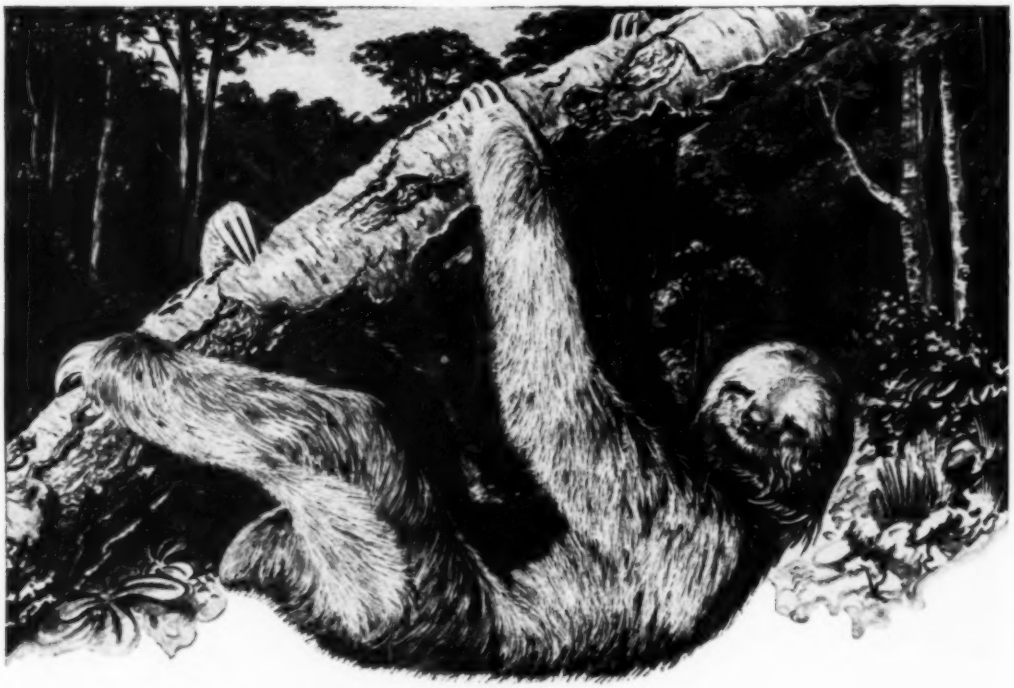
**Longer Wear Between Servicings**

Users report up to four times longer life with Allis-Chalmers CW Pump as compared with standard pumps. Such exceptional life is common because these pumps are made of hard *Allisite* alloy . . . they have thicker sections and heavier parts . . . and they are application engineered by specialists who know how to solve coal washing problems.

Discuss your coal washing equipment problems with an Allis-Chalmers pump engineer. Call your nearby A-C District Office or write Allis-Chalmers, Milwaukee 1, Wisconsin. Ask for Bulletin 08B6381. A-3521

*Allisite* is an Allis-Chalmers trademark.

**ALLIS-CHALMERS**



# *in WIRE ROPE, too load strain calls for SPECIALIZED muscles*

Everything looks upside down to the three-toed sloth. Unique among animals, he prefers to live his life dangling downward from the top branches of tall trees. Helping him to survive in his topsy-turvy world are highly specialized and powerfully developed rear and forelimb muscles.

In wire rope, too, specialized jobs call for the right kind of muscle. Load strain! Bending fatigue! Shock stress! Abrasion! Each calls for wire rope that best combines the required resistance characteristics.

Complete quality control from ore to finished rope; long experience and specialized know-how—these are your assurance that in Wickwire Rope you always get the proper combination of physical properties for long-lasting, reliable service on your particular job.

For additional information write or phone our nearest sales office.

THE COLORADO FUEL & IRON CORPORATION—Abilene (Tex.) • Denver • Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa
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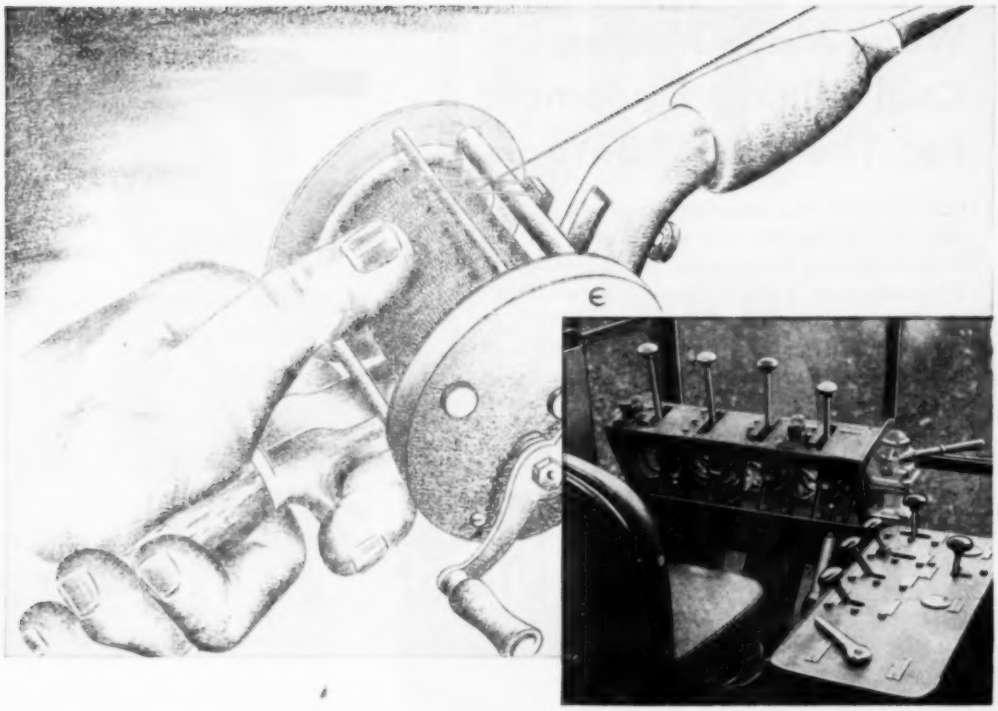
WICKWIRE SPENCER STEEL DIVISION—Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) • New York • Philadelphia

LOOK FOR
THE YELLOW TRIANGLE
ON THE REEL

**WICKWIRE ROPE**

CF&I PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION



## Complete Command of Operations . . .

*Right under your thumb*

With LIMA precision air controlled clutches and brakes you get the same smooth, easy, responsive control of the hoist and drag lines that you do when you apply the under-the-thumb tension to the line on a fisherman's reel.

There are other advantages, too. LIMA precision air control promotes long life of the machine and uniformity to the operating cycle. It also automatically compensates the adjustments of the clutches for wear of lining and to meet weather and operating conditions.

Last (but by no means least), there's no mid-afternoon slowdown because of operator fatigue. Both man and machine can work at peak level for the entire shift.

***LIMA SHOVELS*** are available in capacities from ¾ to 6 yards.
***LIMA CRANES*** are available in sizes to 110 tons capacity.
***LIMA DRAGLINES*** are available in variable capacities to suit specific needs.
Wheel or truck mounting is available on machines of ¾ and 1½ yards capacity.

BALDWIN-LIMA-HAMILTON CORPORATION
LIMA-HAMILTON DIVISION
LIMA, OHIO

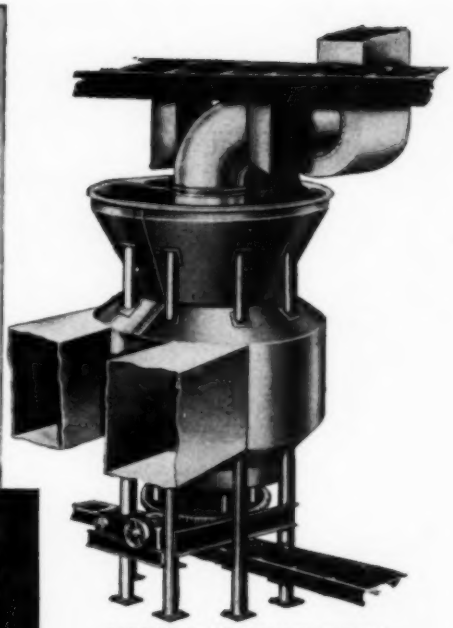
OFFICES IN PRINCIPAL CITIES OF THE WORLD

**BALDWIN-LIMA-HAMILTON**

**SHOVELS • CRANES • DRAGLINES • PULLSHOVELS • TRUCK CRANES**

# We've Made Nothing But Coal Mining Equipment For The Past 80 Years

Use this specialized experience to obtain the most advanced design, the best of materials and the latest methods of manufacture. Take advantage of this background of creative engineering and long-standing reputation for sturdy construction that assured efficient, dependable performance at lower over-all costs. Call a Holmes Mine Equipment engineer for consultation in the planning and development of your requirements. There is no obligation.



**BAUGHMAN "VERTI-VANE" THERMAL COAL DRYER** for economical, uniform large-scale drying of all sizes, from 1¼" down. Reduces surface moisture to approx. 2%. Unit handles 15 to 75 tph. Ask for Catalog No. 101.

# HOLMES

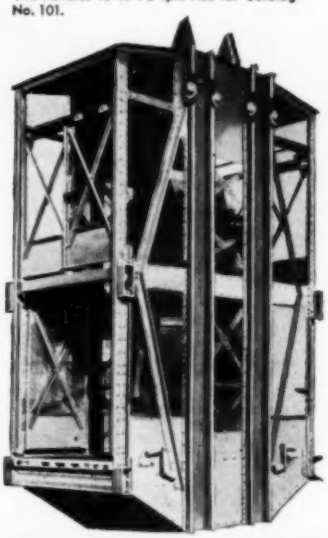
## MINING EQUIPMENT

*SINCE 1872*

ROBERT HOLMES & BROS., INC.
DANVILLE, ILLINOIS

**ADVANCE DESIGN HOISTS** feature the latest and most complete control equipment. Ask for complete information.

**HOLMES HEAVY-DUTY CAGES** in all sizes and types for rapid hoisting and low maintenance. Ask for complete information.



SHEAVES

TIPPLE EQUIPMENT

CAGES

SKIPS

LOWERING SPIRALS

CAR PULLERS AND RETARDERS

LABORATORY CRUSHERS

HOISTS

VIBRATING SCREENS

DUSTOLATORS

# cut tonnage costs

with P&H ELECTRIC SHOVELS

In more and more locations these ultra-modern P&H machines are taking over the jobs that call for big production — steady digging. Users who know their cost accounting come back for more — for one proved reason . . . *lower tonnage costs.*

Contributing factors are these:

P&H Magnetorque* Hoist Drive powers hoisting motions electro-magnetically, gives you snappier dipper action — eliminates hoist generator, slip friction clutch and other troublesome mechanical devices.

P&H stepless power regulation is smooth and accurate — with no control fingers or contactors to give you trouble.

Independent propel, all-welded construction, filtered air cab and other modern refinements have led the way to more dependable production on a year-in, year-out basis.

If you seek lower tonnage costs in open pit work, let us tell you where you can see a P&H Electric Shovel in action. Ask about a P&H today.

*T.M. of Harnischfeger Corporation for electro-magnetic type clutch

*Every third P&H Electric Shovel sold is a repeat order*

**HARNISCHFEGER**
**CORPORATION**
4540 West National Avenue • Milwaukee 46, Wisconsin

POWER SHOVELS • CRAWLER AND TRUCK CRANES • OVERHEAD CRANES • ARC WELDERS AND ELECTRODES • SOIL STABILIZERS • DIESEL ENGINES • PRE-FABRICATED HOMES

## Accept no more substitutes!

Now, you can again get genuine Carboloy Coal Mining Tools. As fast as Carboloy quality production methods permit, we are rushing new stocks to your Carboloy Distributor. Check your needs; then see him. He will be glad to cooperate in every way in filling your needs.

# Cut more coal per shift, with Carboloy Coal

You beat down profit-eating tool costs per ton. You save money in almost every operation directly dependent on coal cutting when you choose mine-proved Carboloy Coal Mining Tools. Designed right, built right—of genuine Carboloy Cemented Carbide, *hardest metal made by man*—to give you the last word in cutting-tool performance.

## YOU GET THESE 7 VITAL ADVANTAGES FROM EVERY CARBOLOY TOOL

**1** Carboloy Coal Mining Tools will cut more coal for you per shift than *any* others will under the same conditions.

**2** They stay sharper far longer between grinds; materially cut time wasted in bit changing. (They keep costly machinery working more of the time, bring down equipment cost assigned to each ton of coal; help men be more productive, help reduce labor cost per ton.)

**3** They give you longest possible tool life.

**4** Take more regrinds per tool.

**5** They need less power.

**6** Put less wear and tear on vital machinery, make clean, shattering cuts.

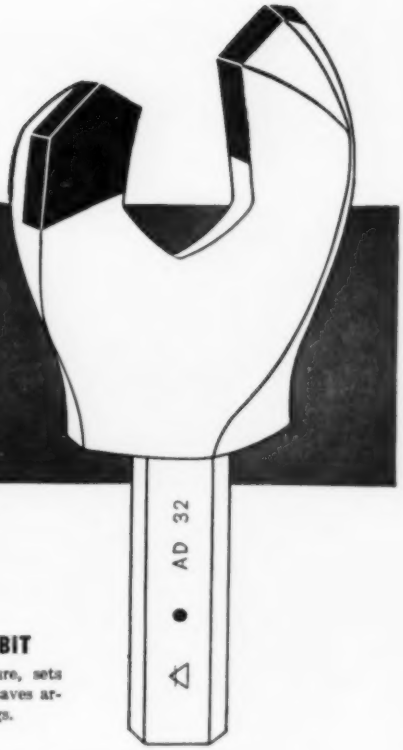
**7** Require much less reconditioning time when finally worn.

•

*Let us send you any information you might want on any Carboloy Coal Mining Tool.*

SPECIFY CARBOLOY, THE QUALITY

# *cut costs more Mining Tools*



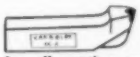

## FREE SERVICE PROGRAM HELPS CUT COSTS

To help you get from Carboloy Coal Mining Tools everything we build into them, we offer these free services:

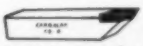
- Complete, tuition-free training course for your key personnel. Features: instruction, demonstrations, correct grinding practices. Special discussions with your men on cemented carbides in relation to most efficient coal mining under *your* setup.
- Assistance and advice of qualified Carboloy Field Engineers and your local Carboloy Distributor.
- Clear, concise maintenance-instruction manual and Catalog No. CM-100.

Write us direct for any information on any of these services.

**AUGER DRILL BIT**
requires less pressure, sets up less vibration, saves armatures and bearings.



**CC-2 COAL CUTTER BIT**
for all cutting machines, including continuous types, that use ½" by 1" bits.



**FINGER BIT**
for strip or underground mining. Does amazing job of gouging.

**TWO-PRONG ROOF BOLTING DRILL**
for drilling through softer rock, such as shale, bony, and laminated sandstone.

**SOLID ROOF BOLTING DRILL**
for drilling in hard slate, hard shale, laminated limestone, and massive sandstone.

"Carboloy" is the trademark for the products of Carboloy Department of General Electric Company

# CARBOLOY

DEPARTMENT OF GENERAL ELECTRIC COMPANY
11120 E. 8 Mile Ave. • Detroit 32, Michigan

BRAND OF COAL MINING TOOLS

## the DORR 4-Arm Torq Thickener

# *Makes lighter Work of* **Granular Coal Sludges**

To handle heavy granular solids subject to widely fluctuating feeds — note the 4-arm feature of the Dorr Torq Thickener.

Two long arms rake the outer section of the tank floor. The two short arms handle the load in the inner section, raking all the solids to a conventional center-cone discharge. All four arms are provided with the exclusive Torq feature . . . which reduces overload by continuous raking action . . . eliminates the danger of stalling and damaging the unit.

For more information about the mechanical advantages of the 4-Arm Torq and the complete Dorr Thickener line, ask us to send you a copy of Bulletin No. 3001. THE DORR COMPANY, Barry Place, Stamford, Conn.

*Torq is a registered trademark of The Dorr Company.*

Better Tools TODAY to meet Tomorrow's demand

DORR

WORLD - WIDE RESEARCH · ENGINEERING · EQUIPMENT

THE DORR COMPANY · ENGINEERS · STAMFORD, CONN.
Offices, Associated Companies or Representatives in principal cities of the world.

# Head and Tail Swing-Motion* a Goodman exclusive for TRACTOR TREAD LOADERS

*It's winning new friends every shift, in mines throughout the country

The swing's to Goodman swing-motion loaders. See them in action and see why. Let us arrange a mine visit.

Type 665
43" over-all height

Type 660
33" over-all height

Type 865
26½" over-all height

- Swing at *both* ends is an operating advantage in any mining condition. It is particularly effective in narrow work where crosscuts are driven at 90° angles, in pillar recovery work, and where posting is close.
- In straight-away loading, the swinging head permits wide cleanup with only forward and backward tramming.
- Tail swing provides convenient discharge—speeds work.

Swing-motion is not the only advantage of Goodman loaders. There are others, such as: continuous, powerful action of gathering arms; liberal vertical range of head for digging tight coal at best height; floating loading head that picks up loose coal on uneven bottom; complete hydraulic control; low maintenance cost; precision engineering of all parts; accessibility of all units; dependable installation and follow-up service.

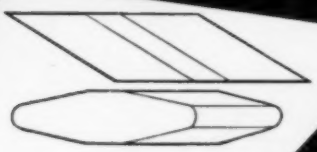
**Goodman MANUFACTURING COMPANY**
HALSTED STREET at 48th • CHICAGO 9, ILLINOIS

To COAL MINES
Everywhere

*for 20 years*

# BOWDIL BIT ORDERS HAVE BEEN SHIPPED THE SAME DAY RECEIVED

Designed especially for specific coal cutting requirements, made from special alloy steel, heat treated to a variety of hardnesses, these bits are available in special shapes, contours of the cutting face, and clearance angles. Bowdil Bits are the result of many years of research on actual cutting conditions in the field by the Bowdil Company.



**The 1-2 DIAMOND BIT,** designed along the same lines as the 1-1, is especially adapted for severe cutting (Iron Pyrites and Rock).

**The 1-1 DIAMOND BIT,** designed for use where the cutting conditions are not too severe, saves power and produces larger slack.

**The 1-11 CONCAVE BIT** is designed for even greater power savings. This bit has a narrow cutting face and special side clearance which becomes greater as the cutting point wears away.

**The 1-6 LONGWALL BIT** is especially designed with a long cutting point for Longwall work.

*The* **BOWDIL** *Company*

CANTON, OHIO

# WIRE ROPE

## *This is the most economical rope we've ever made for mining*

ROEBLING is the best known name in wire rope. That's partly because we were the first wire rope maker in America. But more than that, we've always led in developing better wire and better rope for every purpose.

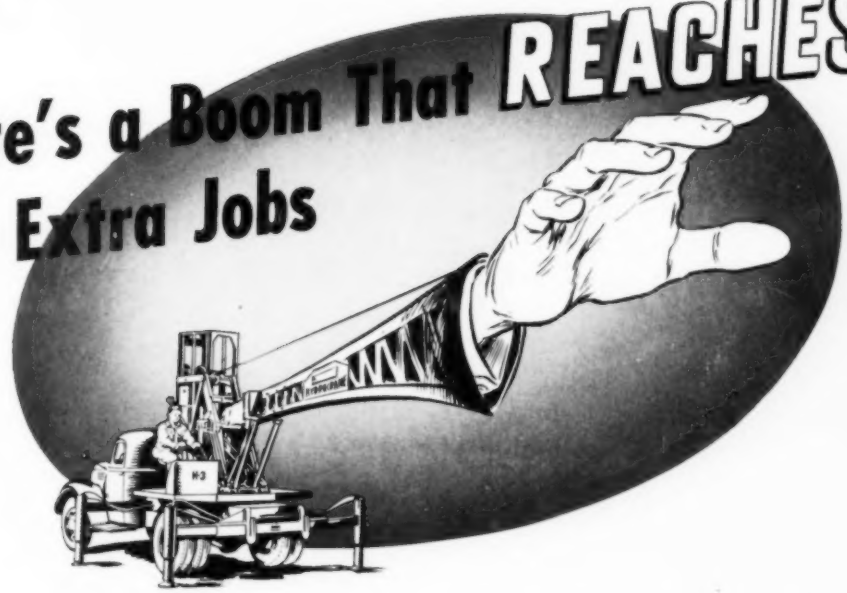
Today's Roebling Preformed "Blue Center" Steel Wire Rope is the miners' best choice for efficiency and long life. This rope has *extra* resistance to crushing and abrasion . . . stands up under rough going. It saves you time and cuts costs.

There's a Roebling wire rope of the right specification for top service on any job. Call on your Roebling Field Man for his recommendations. John A. Roebling's Sons Company, Trenton 2, N. J.

**ROEBLING**

ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 701 ST. CLAIR AVE., N. E. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, N. J.

# Here's a Boom That REACHES For Extra Jobs



The all-hydraulic 3 ton Bucyrus-Erie Hydrocrane, with telescoping boom, reaches into windows, doors and box cars . . . over fences . . . under beams . . . between wires and beams — without moving crane an inch! Boom extends and retracts a distance of eight feet.

The outstanding advantages of telescoping boom plus precision hydraulic control combine to make the Hydrocrane ideal for placing conveyor machinery in shaft cage — unloading freight cars — dismantling and erecting machinery — clean-up around tipple tracks — cleaning out mine cars — and handling mine timbers. A special hydraulic grapple picks up and sets down mine timbers without assistance — eliminates need of helper who handles chain and crane hook.

Here's a crane that fills the bill on dozens of surface jobs around the mine. It squeezes into close quarters — operates by cushion smooth hydraulic power — is controlled entirely by hand levers, no tricky foot work.

Write now for full details or see your Hydrocrane distributor. 158H52

BUCYRUS ERIE HYDROCRANE

Every crane function fully hydraulic — boom hoist, load hoist, swing, boom telescope, outrigger set and retract bucket closed.

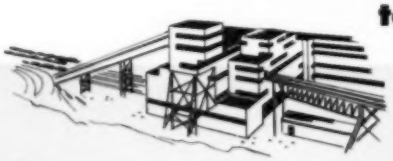
Owners report 35 percent faster shaft mucking, 30 percent less manpower with new Hydromucker. Here's a fast mechanized way to remove muck in shaft sinking work — the Bucyrus-Erie Hydromucker. Heart of unit is a hydraulically operated clamshell bucket specially designed for close quarter work. Other components include hydraulic pumps, electric motor and control banks. Bucket loads material from shaft floor to skip, car or other suitable conveyor for removal to surface.

**Bucyrus-Erie Hydrocrane Division**

South Milwaukee, Wisconsin

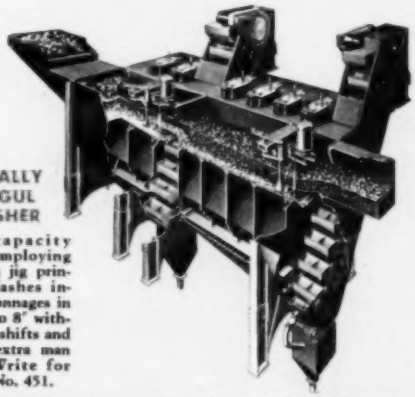
# Equipment ...READY FOR WORK

## To Up-grade Your Coal to the Premium Class



### McNALLY NORTON WASHER

Positive separation of coal from noncombustible material. Washes sizes 8" to 0. Models 25 to 450 TPH. Write for Bulletin No. 451.

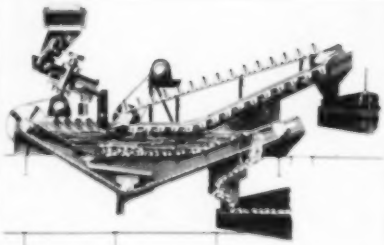


### McNALLY MOGUL WASHER

Super-capacity washer employing the baum jig principle. Washes increased tonnages in sizes up to 8" without extra shifts and without extra man power. Write for Bulletin No. 451.

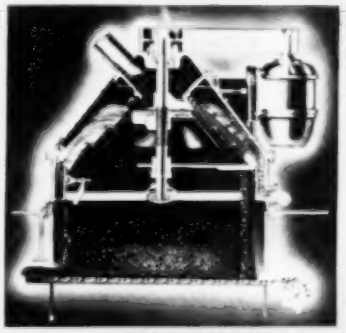
### GEARMATIC CRUSHER

Stoker coal crusher for accurate sizing, high production, low percentage of fines. 6 Sizes for capacities up to 300 TPH. Write for Bulletin No. 151.



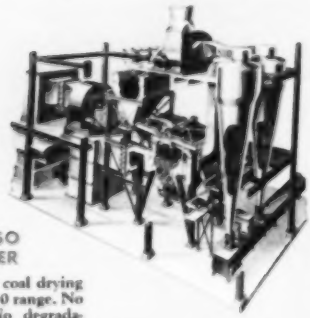
### TROMP DENSE MEDIA WASHER

Dense media bath for large lump down to ¼" in the low-gravity and high-gravity ranges. Available in tonnages to meet your needs. Write for Bulletin No. 451.



### CARPENTER DRYER

Centrifugal unit makes continuous drying possible. High water removal . . . Small loss of product in effluent. Especially efficient in drying minus ¾" sizes. Write for Bulletin No. 1149.



### PULSO DRYER

For fine coal drying in ¾" x 0 range. No dust. No degradation. No air pollution. No loss of coal tonnage. Available in tonnages to meet your needs. Write for Bulletin No. 551.

**McNALLY PITTSBURG**

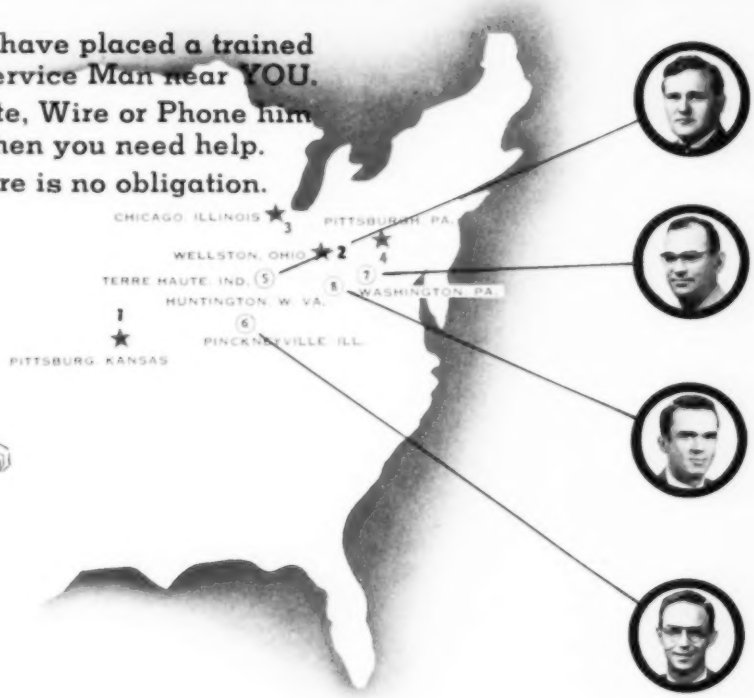
MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

McNally Pittsburg Manufacturing Corporation — Manufacturing Plants: Pittsburg, Kansas • Wellston, Ohio
Engineering & Sales Offices: Pittsburgh • Chicago • Rio de Janeiro • Pittsburg, Kansas • Wellston, Ohio

# Men ...AT WORK

**For Prompt Service without Obligation**

**We have placed a trained Service Man near YOU. Write, Wire or Phone him when you need help. There is no obligation.**




1. ★ PITTSBURG, KANSAS. Main Plant and Executive Offices. Telephone 542.
2. ★ WELLSTON, OHIO. Subsidiary Plant and Offices. Telephone 167.
3. ★ CHICAGO, ILLINOIS. Sales and Engineering Offices. Telephone FRanklin 2-5172.
4. ★ PITTSBURGH, PA. Sales and Engineering Offices. Telephone Grant 12640.

★ *Indicates plant cities and district offices.*

5. JEROME V. "JERRY" LENTZ. 115 N. Fruitridge Ave., Terre Haute, Ind. Telephone Lincoln 2779.
6. WESLEY SMITH. P. O. Box 335, Pinckneyville, Ill. Telephone 6266.
7. R. E. "DICK" IVEY. 1028 Michigan Ave., Washington, Pa. Telephone 3089-R.
8. ELLIOTT NORTHCOTT. 606 13th Ave., Huntington, West Virginia. Telephone 3-8578.

*Service engineers are always available on call to the above district offices.*

**McNALLY PITTSBURG**

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

McNally Pittsburg Manufacturing Corporation — Manufacturing Plants: Pittsburg, Kansas • Wellston, Ohio
Engineering & Sales Offices: Pittsburgh • Chicago • Rio de Janeiro • Pittsburg, Kansas • Wellston, Ohio

# CHEVROLET Advance-Design TRUCKS

*Buy on these plain, hard FACTS!*

CHEVROLET first in demand in value in sales

**Fact No. 1**

**COSTS LESS TO BUY**

Payload pound for payload pound, a Chevrolet truck *lists for less* than any other truck with the qualifications to handle your job. As the world's largest manufacturer of trucks, Chevrolet takes advantage of production economies to pass substantial savings on to you!

**Fact No. 2**

**SAVES MONEY ON THE JOB**

Chevrolet trucks save you money over the miles with great proved features that cut costs. Valve-in-Head economy, rugged Hypoid rear axles, extra-sturdy channel-type frames and Flexi-Mounted cabs, Ball-Gear Steering, Synchro-Mesh Transmission.

**Fact No. 3**

**RIGHT TRUCK FOR EVERY LOAD**

Your first interest in a truck is: "How well will it do the job?" That's where Chevrolet trucks have it, because they're factory-matched to the payload—tires, axles, frame, springs, engine, transmission, brakes. You get as much truck as your job calls for.

**Fact No. 4**

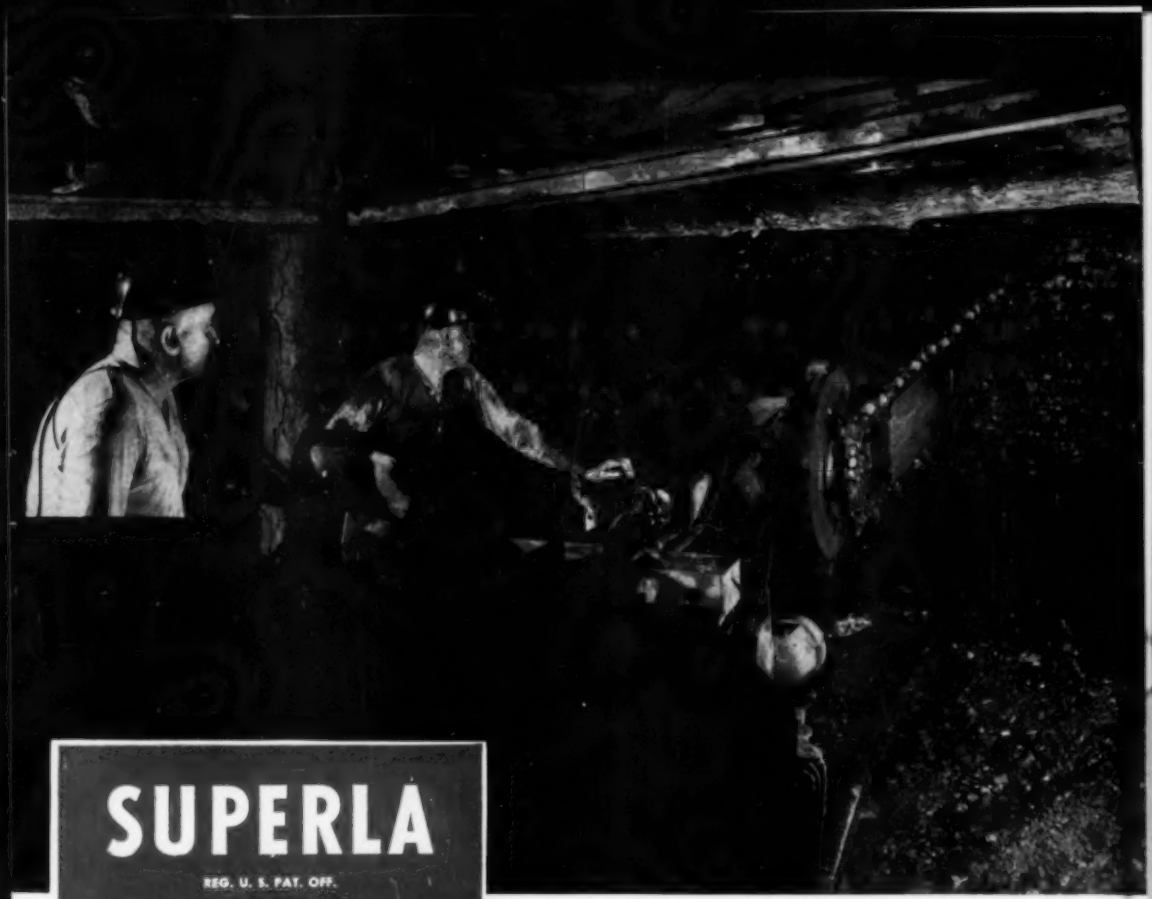
**KEEPS ITS VALUE LONGER**

Chevrolet trucks traditionally keep their value longer to bring higher used truck prices, year after year, at trade-in time. That means real, substantial dollar-and-cents savings when you wish to replace your present truck with a new one.

## CHEVROLET ADVANCE-DESIGN TRUCK FEATURES

TWO GREAT VALVE-IN-HEAD ENGINES—Loadmaster or the Thriftmaster—to give you greater power per gallon, lower cost per load • POWER-JET CARBURETOR—for smooth, quick acceleration response • DIAPHRAGM SPRING CLUTCH—for easy-action engagement • SYNCHRO-MESH TRANSMISSION—for fast, smooth shifting • HYPOID REAR AXLE—for dependability and long life • TORQUE-ACTION BRAKES—on light-duty models • PROVED DEPENDABLE DOUBLE-ARTICULATED BRAKES—on medium-duty models • TWIN-ACTION REAR BRAKES—on heavy-duty models • DUAL-SHOE PARKING BRAKE—for greater holding ability on heavy-duty models • CAB SEAT—with double-deck springs for complete riding comfort • VENTI-PANES—for improved cab ventilation • WIDE-BASE WHEELS—for increased tire mileage • BALL-TYPE STEERING—for easier handling • UNIT-DESIGNED BODIES—for greater load protection • ADVANCE-DESIGN STYLING—for increased comfort and modern appearance.

CHEVROLET DIVISION OF GENERAL MOTORS, DETROIT 2, MICHIGAN



# SUPERLA

REG. U. S. PAT. OFF.

## Mine Lubricant No. 0

## Cutting . . . lubrication troubles

● Operators of this midwest mine depend on SUPERLA Mine Lubricant No. 0 for trouble-free lubrication, not only in the gear cases of their three cutters, but in the transmissions of two Goodman loaders as well. This one lubricant, recommended by a Standard Oil lubrication specialist, does both jobs with equal success, and simplifies stocking of lubricants at the mine.

In three years of operation with SUPERLA Mine Lubricant there have been no cases of downtime of loaders or cutters due to faulty lubrication. Wear has been held to a minimum. Warm-up time for the loaders has been eliminated.

SUPERLA Mine Lubricant has cut lubrication troubles in this mine . . . it can do the same in your mine. There's a Standard Oil lubrication specialist located near you who knows mining equipment and how to lubricate it best. He is at your service for on-the-job help on any problem related to lubrication. Why not call on him today? Just contact your nearest Standard Oil office, or write: Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

**STANDARD OIL COMPANY** STANDARD *(Indiana)*

## The Worker's Nose Knows!

# Safety Goggles

Adjustable
Nose Pads of
**AO FX9200**
**GOGGLE**
Make it
Easy to Fit
the Hard to Fit

Now with the new AO FX9200 goggle, the hard-to-fit worker can enjoy the safety, unobstructed vision and lightweight comfort which the AO FX9200 series goggle provides. Non-corrosive nose pads of thin cellulose acetate adjust for perfect fit easily . . . and they are removable for quick replacement just as easily. "Rocking" nose pad construction distributes goggle weight broadly for pressure-free comfort. The FX9200 is particularly recommended with prescription Super Armorplate lenses, with or without side shields. Your nearest "MSA" Representative can supply you.

***Quick Facts***

- Hinges and temples out of line of sight for unobstructed vision
- Lenses conform to eye orbit for better vision and looks
- Comfort cable or skull temples
- Side shields of perforated acetate to prevent lens fogging
- Keyhole bridge for extra protection and snug fit

*AO's Industrial Vision Program Increases Production, Decreases Accidents. Write today for booklet "Improved Industrial Vision" to 61 Vision Park, Southbridge, Mass.*

**Register and Vote!**

American Optical
SAFETY PRODUCTS DIVISION

SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES

# "Big Red" TD 24 Cleans Up in Church Hollow

**CLEAR-CUT WORKER.** Tony Mamone's TD-24 clears away the trees preparatory to cutting down the overburden of this high summit in Church Hollow.

## International's Champ of Crawlers does the job right for West Virginia mine operator

Down in Church Hollow in the Blue Ridge Mountains, a Big Red International TD-24 has stepped up Tony Mamone's production 200 tons a day and put his operation well into the profit side of the ledger.

Owner Mamone tells how his TD-24 does it:

*"With my TD-24 taking off overburden and trees where I'd not think of sending in another tractor, I've been able to save half in powder. By getting down to solid rock the shots break up better. Using my TD-24 I've been able to save buying a bigger shovel—the TD-24 brings my coal down to ordinary shovel height.*

*"In fact, my TD-24 is sent in on the very worst work. A coal stripper can't make good money these days without a TD-24."*

Get the whole story on what International power can do for you from your International Industrial Distributor. Check his shop and service facilities. Get set now for the years ahead with International "power that pays."

**INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILLINOIS**

**CUTTING ALONG THE HIGHWALL.** The TD-24 steers with fingertip hydraulic control, has full reverse synchromesh transmission, makes faster cycles. That's why coal production is high here.

INTERNATIONAL HARVESTER

INTERNATIONAL

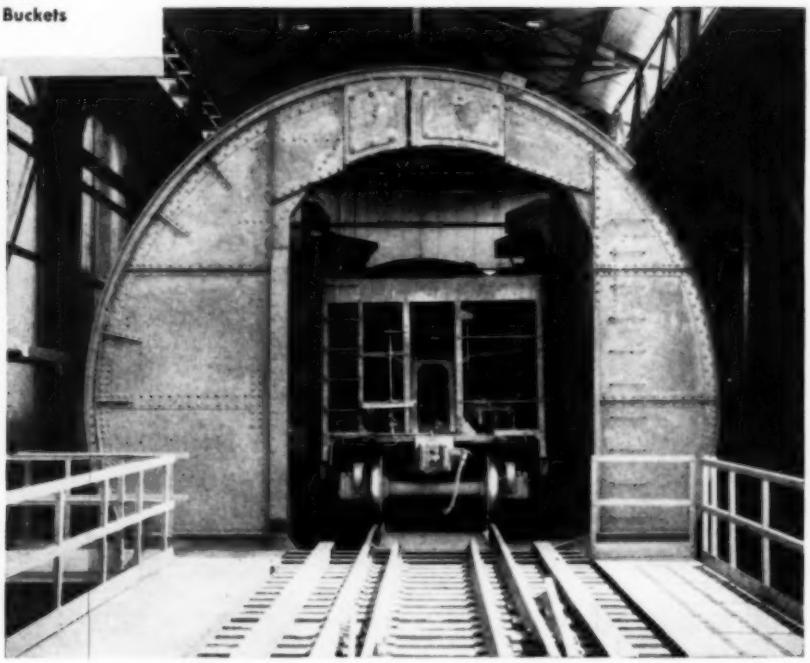
POWER THAT PAYS

**Wellman will build it**

Special Cranes
Car Dumpers
Gas Producer Plants
Ore Bridges
Charging Machines
Forging Manipulators
Gas Flue Systems
Gas Reversing Valves
Coke Pushers
Mine Hoists
Skip Hoists
Clamshell Buckets

# → Wellman car dumpers

...designed and built for years of dependable service



*Wellman 60-ft., 4-clamp Revolving Car Dumper. A rack segment and pinion at each end of the frame turns each end equally, preventing distortion of the frame.*

● The complete line of Wellman Car Dumpers includes Lifting, Turnover, Traveling and Revolving Types, the latter is shown above. It is self-contained, requiring no external structures. You can depend on Wellman equipment for many years of economical performance. It is backed by more than half a century of experience in engineering, manufacturing and construction.

**THE WELLMAN ENGINEERING COMPANY**

7000 CENTRAL AVENUE • CLEVELAND 4, OHIO

# Using the RIGHT Wire Rope for the Job?

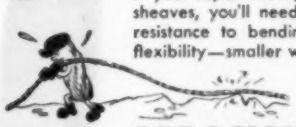
You'll get longer service life from wire rope if you do. Here are some points to keep in mind when you're selecting wire rope for any equipment . . .

## STRENGTH

Don't send a boy to do a man's job. Make sure the wire rope you order has enough strength to take care of the maximum load—*plus* a necessary safety factor.

## FLEXIBILITY

If your ropes undergo repeated bending over small sheaves, you'll need a flexible rope with maximum resistance to bending fatigue. Two things increase flexibility—smaller wires and preforming.



## ABRASION RESISTANCE

Lang lay ropes, when properly installed, and constructions with large outer wires will help extend the service life of drag lines and other wire ropes that are subject to severe abrasive wear.

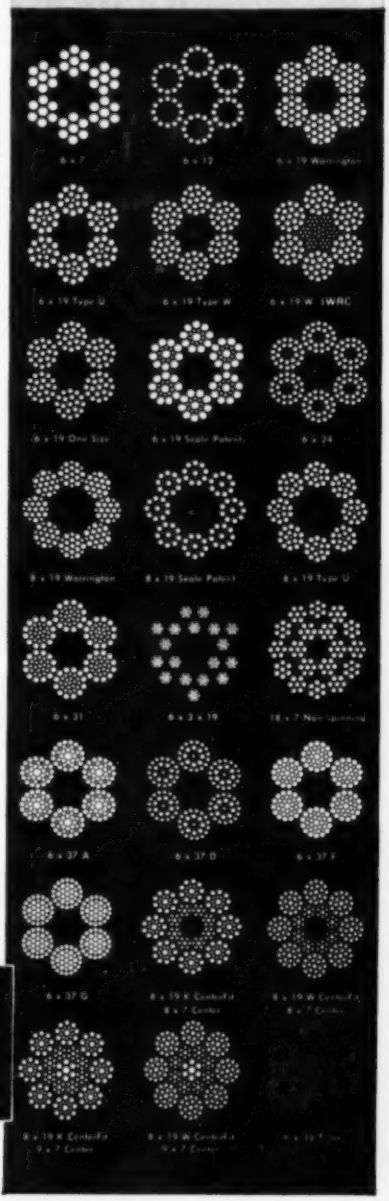
## RESISTANCE TO CRUSHING

An independent wire rope center gives outside strands the support necessary to withstand crushing and distortion—large outer wires help spread the load over a greater area.

When you're looking for ways to cut operating costs, why not enlist the help of your nearest J&L Wire Rope representative? He'll help you select the *right* balance of these wire rope properties to get the longest service life on your specific type of equipment and operating condition.

Through years of research and actual operation in the field, J&L has developed a complete line of wire rope sizes and constructions. You'll find it profitable to cash in *NOW* on J&L experience and manufacturing know-how.

**Select a Wire Rope that Fits Your Equipment Needs**

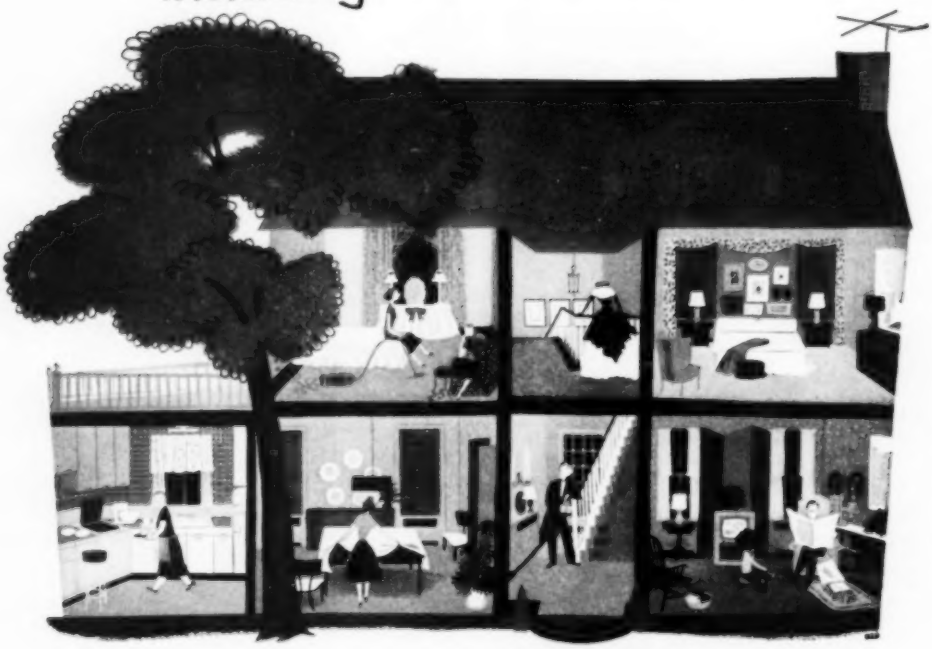

6 x 7
6 x 12
6 x 19 Warrington
6 x 19 Type U
6 x 19 Type W
6 x 19 W IWRC
6 x 19 One Size
6 x 19 Seale Patent
6 x 24
8 x 19 Warrington
8 x 19 Seale Patent
8 x 19 Type U
6 x 31
6 x 3 x 19
18 x 7 Non-spinning
6 x 37 A
6 x 37 B
6 x 37 F
6 x 37 G
8 x 19 K Controfix 8 x 7 Center
8 x 19 W Controfix 8 x 7 Center
8 x 19 K Controfix 9 x 7 Center
8 x 19 W Controfix 9 x 7 Center

**J&L STEEL**

JONES & LAUGHLIN STEEL CORPORATION

401 Jones & Laughlin Building • Pittsburgh 30, Pennsylvania

# JUST ABOUT EVERYTHING
## including the kitchen sink...



## depends on COAL!

Your fine, modern appliances are made from steel which is made from coal. And coal generates the electricity to run them. It's coal that brings heat to millions of families . . . powers the manufacture of the rich variety of products you find in America's homes. Indeed, most of the good things that make our standard of living the highest in the world depend on coal!

Because coal is so useful, it's important to all of us that America's coal industry is the world's most efficient —that America's vast coal reserves can supply the nation's heat, light and power for centuries to come!

**Responsible for choosing a fuel to power a factory—to heat a home or other building? Then consider the many important advantages of bituminous coal!**

### DOWN-TO-EARTH FACTS ABOUT COAL!

- ☆ **Lowest-priced fuel almost everywhere!**
- ☆ **Labor costs are cut with modern boilers and automatic handling equipment!**
- ☆ **Easiest and safest to store *of all fuels!***
- ☆ **America's vast reserves make coal's supply always dependable!**
- ☆ **Dependable supply assures price stability!**
- ☆ **A progressive industry strives constantly to deliver an ever better product at the lowest possible price!**

**BITUMINOUS COAL INSTITUTE**
**A Department of National Coal Association, Washington, D. C.**

*FOR ECONOMY AND DEPENDABILITY*

# *YOU CAN COUNT ON COAL!*

PROX

# tool steel bits

**drop forged for strength...the toughest longest lasting bit on the market today!**

**Get the extra value that can be yours when you choose PROX**

- Drop forged for extra strength
- Exclusive circular back edge
- Quickly replaceable
- Positive bit setting

**...get the point?**

**the only bit designed with the circular back construction for greater cutting strength**

Nationally famous Prox Tool Steel Bits are expertly designed to withstand the hardest cuttings. The drop forging method changes the grain structure and lengthens the life of these throw away bits. Labor costs are cut with Prox Bits because they can be easily and rapidly changed. For efficiency and economy—it's Prox Tool Steel Bits!

Write today for complete information and specification on cutter chains and bits best suited for your particular needs.

**FRANK PROX COMPANY · INC.**

PROX

**TERRE HAUTE, INDIANA**

# from Face through Preparation

*Prepares It!*

JIGS AND WASHERS
CRUSHERS
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SCREENS
BELT CONVEYORS
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BUCKET ELEVATORS
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LOADERS
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CUTTERS
LOCOMOTIVES
SHUTTLE CARS
CONTINUOUS MINING MACHINES
FANS AND BLOWERS
UNDERGROUND CONVEYORS
CHAINS

1877 75 YEARS 1952

**Jeffrey is unique in the ability to fulfill your needs with a complete line of mining and preparation facilities. Consider the important values resulting from unit responsibility, standardization of parts and completely integrated engineering, design and construction... from the working face on through the various processes in the coal preparation plant.**

**Extensive research and testing facilities together with our 75 years of mining experience — assure you maximum satisfaction. Put our knowledge to work for you.**

## THE JEFFREY MANUFACTURING COMPANY

*Established 1887*

*General and Export Sales Offices*

**COLUMBUS 16, OHIO, U. S. A.**

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In West Virginia: BECKLEY • CABIN CREEK • LOGAN • MORGANTOWN • WELCH

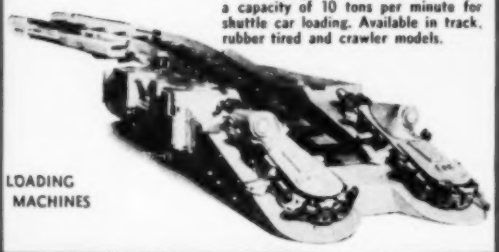
### ASSOCIATED COMPANIES

JEFFREY MFG. CO. LTD., Montreal, Canada
BRITISH JEFFREY DIAMOND LTD., Wakefield, Eng.
JEFFREY-GALION (PTY.) LTD., Johannesburg, S. A.
GALION (GREAT BRITAIN) LTD., Wakefield, Eng.
THE KILBOURNE & JACOBS MFG. CO., Columbus, O.
THE OHIO MALLEABLE IRON CO., Columbus, O.
THE GALION IRON WORKS & MFG. CO., Galion and Bucyrus, O.

# JEFFREY EQUIPMENT

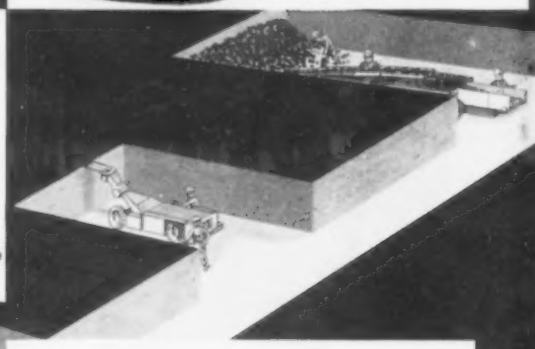
UNIVERSAL COAL CUTTERS

Cut any place in the seam, including shearing. Completely hydraulic in operation. Furnished in 30" and 34½" heights, with single or dual drive wheels.



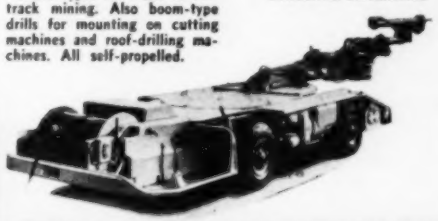
LOADING MACHINES

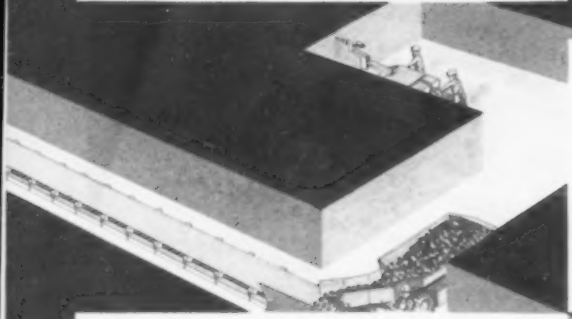
Built in heights of 28" and 36" with a capacity of 10 tons per minute for shuttle car loading. Available in track, rubber tired and crawler models.



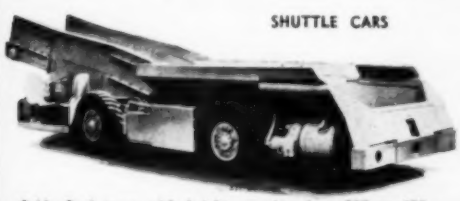
DRILLING MACHINES

Various types for track or off-track mining. Also boom-type drills for mounting on cutting machines and roof-drilling machines. All self-propelled.





SHUTTLE CARS

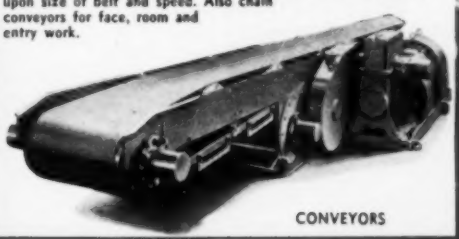


Cable Reel types with heights ranging from 30" to 48"—furnished with either two wheel drive with two wheel steering, or four wheel drive with four wheel steering. All have elevating discharge and complete hydraulic system.

*Mines It!*

*Transports It!*

For gathering or haulage. In three widths for belts 30", 36" and 42" wide—have been operated in lengths exceeding 3,000 feet. Range of speeds vary from 175 to 500 feet per minute—capacities up to 18 tons per minute depending upon size of belt and speed. Also chain conveyors for face, room and entry work.



CONVEYORS

PURCHASING DEPARTMENT MEMO
Chris:
As per your suggestion, checked with Donnelly about performance of Bethlehem Track Bolts. He says he's well satisfied, so I'm ordering another supply from Bethlehem.
B. E.
BETHLEHEM STEEL

**BETHLEHEM STEEL COMPANY**

*Bethlehem, Pa*

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

# "Tycol Acylkup keeps bearings running cool... does not emulsify with water"

That's right! Tycol Acylkup Grease withstands heavy unit pressures . . . resists emulsification with water. It is easily applied by grease gun or central system.

Further, Tycol Acylkup Grease contains a high grade paraffin base cylinder oil that steps up bearing efficiency and assures increased bearing life. Protection against wear is long-lasting.

Your nearest Tide Water Associated Office will be glad to give you complete information. Call or wire today.

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TIDE WATER ASSOCIATED OIL COMPANY

17 BATTERY PLACE - NEW YORK 4, N. Y.

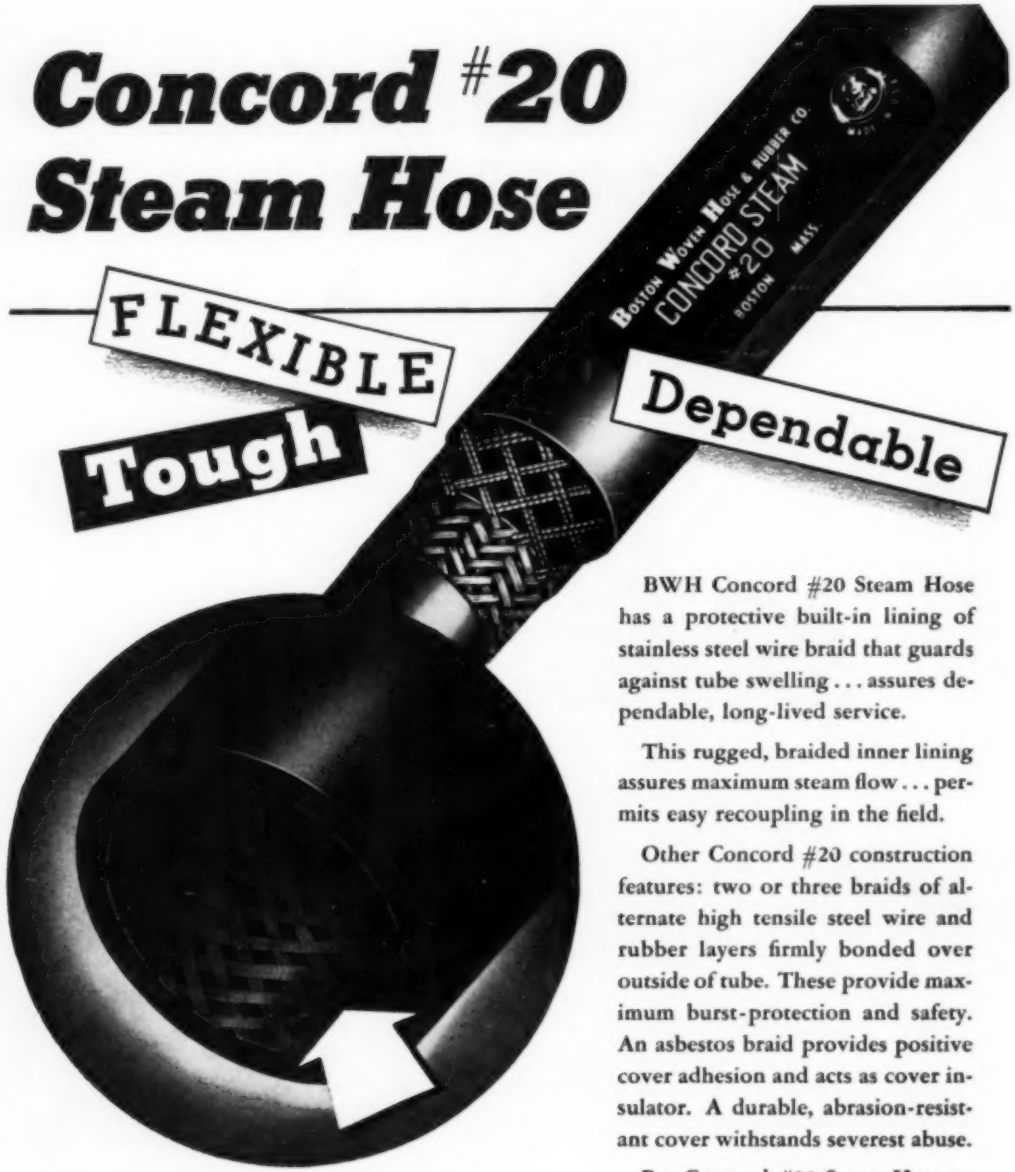
SEND FOR A FREE COPY OF "TIDE WATER ASSOCIATED LUBRICANIA"

# Concord #20 Steam Hose

FLEXIBLE

Tough

Dependable




BWH Concord #20 Steam Hose has a protective built-in lining of stainless steel wire braid that guards against tube swelling . . . assures dependable, long-lived service.

This rugged, braided inner lining assures maximum steam flow . . . permits easy recoupling in the field.

Other Concord #20 construction features: two or three braids of alternate high tensile steel wire and rubber layers firmly bonded over outside of tube. These provide maximum burst-protection and safety. An asbestos braid provides positive cover adhesion and acts as cover insulator. A durable, abrasion-resistant cover withstands severest abuse.

Put Concord #20 Steam Hose to work for *you — now!*

Illustration shows how special built-in lining of stainless steel inner wire braid assures long life under the most severe operating conditions.
Pat. applied for

*Another Quality Product of*

**BOSTON WOVEN HOSE & RUBBER COMPANY**

**Distributors in all Principal Cities**

PLANT: CAMBRIDGE, MASS. • P. O. BOX 1071, BOSTON 3, MASS., U. S. A.

BWH
DEPENDABLE RUGGEDNESS

There's

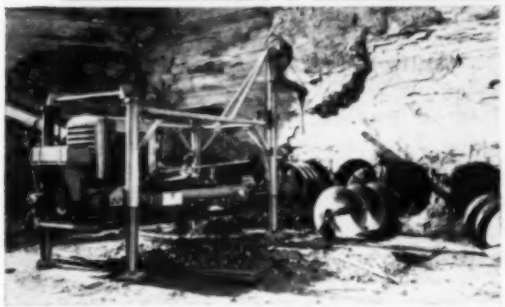
# "Bonus Tonnage" Left—

## where stripping must stop!

***Get Up to 50 TONS of Coal per Man-shift from Overburden-Strangled Seams***

**with CARDOX-HARDSOCG Surface**

# AUGER MINERS



CARDOX-HARDSOCG 145 HP AugerMiner starting new hole in seam. See how hydraulic elevator posts have raised unit for boring directly into seam. Note holes can be drilled closely together, yet ribs between holes provide ample roof support.

***Sold and Serviced Only by Experienced CARDOX Engineers***

At "worked-out" mines, at mines where excessive overburden has made conventional stripping profitless, CARDOX-HARDSOCG Surface AugerMiners are going to work . . . *profitably.* Many operators are finding that AugerMiners can bring up to 50 tons of coal per man-shift out of these "dead" mines—at costs usually far less than the original working.

### High-grade Coal at Low Cost

Low-cost production is assured because previous stripping operations have already exposed the coal seam and no new, expensive development work on the mine is necessary. Vertical direction control of the AugerMiner keeps it drilling in the seam, avoiding rock and shale, thus producing clean, high-grade coal —in sizes you determine by your choice of cutterhead.

### Simple Set-up and Operation

The CARDOX AugerMiner is trucked or towed on detachable wheels to the face of the seam exposed by previous stripping. The unit is set at the height of the seam by its own elevator posts. The auger is then ready to drill directly into the seam to a distance of 100′ or more, automatically bringing out the coal ready for mechanical loading. Augers and 6′ auger extensions are available in diameters up to 42″. The extensions are quickly added or removed with the AugerMiner's hoist and retriever. AugerMiners are available with 95 HP or 145 HP engines.

**Get this extra-profit, *bonus* production of low-cost, clean, marketable coal—contact your CARDOX representative for full information . . . or write for NEW AugerMiner Bulletin today.**

HARDSOCG DIVISION
**CARDOX CORPORATION • BELL BUILDING • CHICAGO 1, ILLINOIS**

# FOR TOUGH TONNAGE

## *Homocord* CONVEYOR BE

"We pay more for Homocord, but it costs us less!" • That's what users say . . . and they won't take any other conveyor belt. It makes sense, too. Where tonnage is toughest, Homocord has been known to outlast 2 or 3 ordinary conveyor belts. Figure cost of belts, plus cost of repeated installations, and Homocord proves the biggest bargain you can get • Its special construction—cushioned and flexible—absorbs impact that other belts can't take. Send for Bulletin 6906 and read about the Guillotine Test that proves our point • The same engineering goes into our hose, V-belts and flat belts. Get your Manhattan representative to show you.

R/M

MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

**RAYBESTOS-MANHATTAN, INC.**

Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Packings • Brake Linings • Brake Blocks
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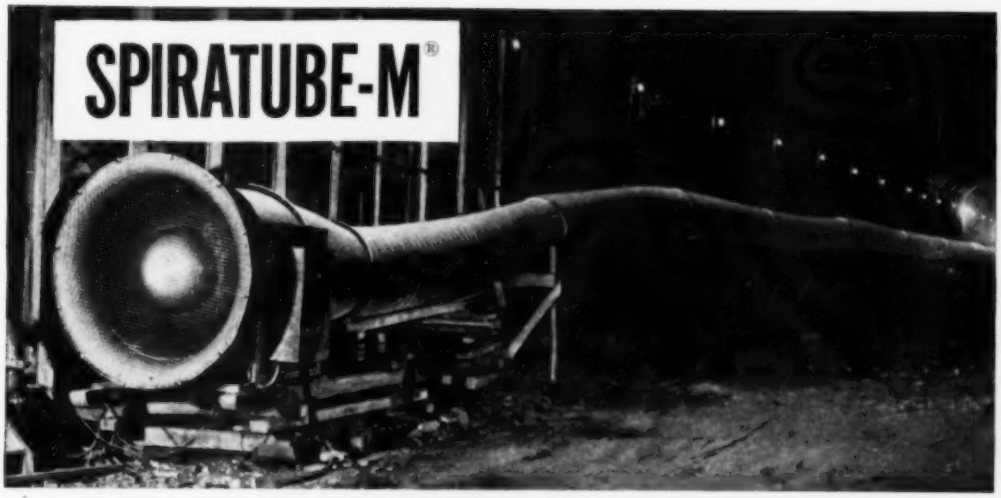


# Simplify mine and tunnel ventilation

Here's the airduct that can take it! Now you can deliver air to the working face of mine or tunnel — cheaper! That's because SPIRATUBE-M is built to cut maintenance costs! Ease of handling reduces installation costs. Unique SPIRATUBE-M construction features minimize leaks and seepage. And you get the maximum efficiency of your blower or fan . . . cutting power costs!

Immediately available in diameters to 30 inches, from fully-stocked distributors, SPIRATUBE-M is made in tough high count fabrics, all specially treated and heavily coated inside and out to withstand fungus, mildew and rough treatment.

And, patented, *built-in*, quick-couplers eliminate the need for separate parts . . . no need to look for couplers when you're in a hurry.

For heavy duty, pressure ventilation tubing without wire reinforcement, ask for AYRTUBE®. Sold in diameters to 36", AYRTUBE by itself or in combination with SPIRATUBE-M offers you an inexpensive airducting.

***Check these features:***

**Handling ease**

**Lightweight**

**Flexible**

**Easily installed by you**

**Takes sharp turns without crimping**

**Withstands fungus, mildew, rough treatment**

Flexible Tubing
CORPORATION

**Guilford, Connecticut • Pasadena 1, California**

**FREE BOOKLET DESCRIBES SPIRATUBE-M and AYRTUBE MINING AND CONSTRUCTION APPLICATIONS. Write for your copy today.**

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# *It's New!*

## Le Roi-CLEVELAND

### S11ST Offset Telescopic Leg Stoper

*It's Fast!*

...and sized right

3 Sizes — 28" - 40" - 52" Feeds

*It's Tough!*

Built *right* by the leading manufacturer of offset and roof-bolting stopers!

S11ST Stoper lengths range from 23" closed to 86½" open.

**Only Le Roi-CLEVELAND S11ST gives you all these features for dependable, low-cost drilling**

★ Convenient right-hand feed control provides the right feeding pressure for fast drilling in any rock.

★ Trip rotation release allows piston to strike straight, hammer-like blows.

★ Feed leg supported at backhead and chuck housing for extra strength.

★ Fewer packings to replace in air-feed leg means less trouble, easiest servicing.

★ Button in handle provides fast, positive feed release, for quicker, easier steel changing.

★ Constant blowing around front end prevents slush and cuttings from entering drill at front end and greatly reduces wear.

★ Water tube can be removed quickly —you don't have to dismantle the machine, just take off the backhead plug.

★ Shielded safety handle protects operator's hands.

★ Air consumption is low.

Standard Le Roi-CLEVELAND S11 Offset Stopers can be converted to this new telescopic type.

So get set for faster drilling and lower costs — standardize on these new stopers. Write for complete details.

LE ROI COMPANY

CLEVELAND ROCK DRILL DIVISION

12500 Berea Road, Cleveland 11, Ohio

# Easy shifting helps drivers get the most out of Eaton 2-Speeds

EATON 2-Speeds are easy to shift at any speed—uphill or downhill. Drivers will use all of the gear ratios provided by Eaton 2-Speeds—the right ratio for every road and load condition. Extra maneuverability, coupled with positive control at all times, means less wear and tear—not only on the driver but on the engine, the axle itself, and all power transmitting parts. Appreciable savings are realized in lower operating expense, reduced maintenance cost, and longer truck life. Your truck dealer will be glad to explain Eaton's simplified shifting, and show you how with Eaton 2-Speeds your trucks will haul more, faster, longer, at lower cost.

# EATON
## *2-Speed Truck*
# AXLES

*Axle Division*
EATON MANUFACTURING COMPANY
CLEVELAND, OHIO

**PRODUCTS:** Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

# WHY FEED THE GOB PILE WITH WASTED RAIL?

We know that a good many operators would welcome a way to reduce or eliminate rail waste. In mines that still cut and curve their own rail, the waste often amounts to 5 pct—and 10 pct is not at all uncommon. As much as 100 ft in every 1000 ft of delivered rail!

No need to remind you how the cost of this can mount up in a year. But there's a way to get around it—and, at the same time, to improve your haulage system.

The answer is Bethlehem Prefabricated Mine Track, in which the rail comes to you precut to proper lengths, precurved to just the proper radii. Any leftovers are immediately available as scrap at the mill. There isn't a foot of wasted rail in the Bethlehem layout built for your mine; no waste in the straight rails, none in the curved rails, none in the turnouts.

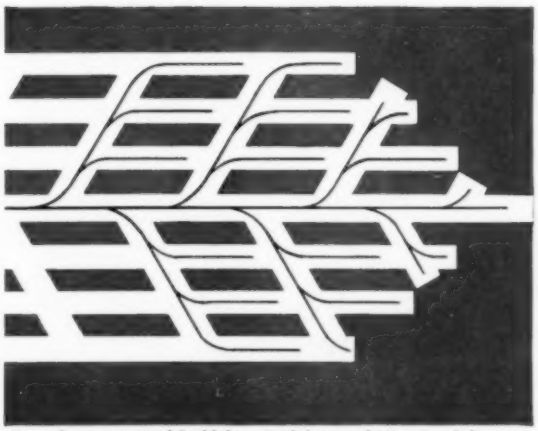
You wonder how this can be done? Well, first a Bethlehem engineer makes a complete study of your haulage plan; then the trackwork is figured to your individual needs, and built accordingly.

Why not let us give you all the facts? The saving in rail is only *one* part of the story. There are several other ways in which Bethlehem Prefabricated Mine Track means substantial economies . . . not to mention better haulage. Full details at your request.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

*On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation*

★ BETHLEHEM STEEL ★



***One of many typical Bethlehem Prefabricated Mine Track layouts. No waste, no misfit parts, no difficult installation problems.***

# How concave sides cut V-Belt costs

Important to anyone who wants to cut V-Belt replacement costs is the simple, interesting reason WHY Gates Vulco Ropes are built with *Concave Sides* (U. S. Patent 1813698). See Figure 1.

When a Gates belt is bent around a sheave these Concave Sides fill out to full, even contact with the sides of the sheave groove. (Figure 1A). This gives you sure pulling power. And, naturally, because wear is distributed evenly, the Concave Sides actually give you longer wear—longer belt life. That cuts V-Belt replacement costs.

On the other hand, when a straight sided V-Belt (Figure 2) is bent, the sides bulge out, preventing the belt from fitting evenly in the sheave groove. This causes *extra wear* at the points shown by arrows. (Figure 2A).

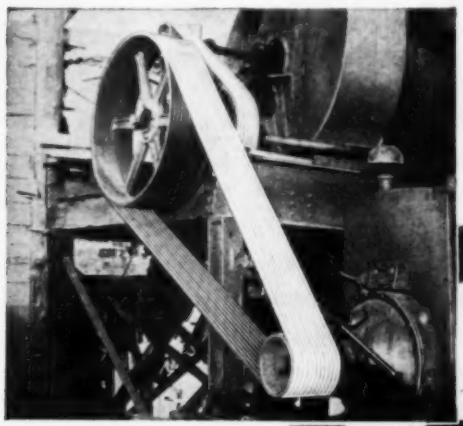
## Make this simple test yourself...

Hold a straight sided V-Belt as it would be bent around a sheave. Take the sides of the belt between your finger and thumb. You can *feel* the bulges in the sides—the bulges that prevent an even fit in the sheave groove and cause extra wear.

Now do the same thing with a Gates Vulco Rope. You can feel the sides fill out. You can see why they press firmly and evenly against the sides of the sheave groove—giving you longer belt life—lower belt costs.

When you buy V-Belts be sure to get Gates Vulco Ropes—the V-Belts with the Concave Sides.

Gates Engineering Offices and Jobber Stocks are located in all industrial centers of the United States and in 71 foreign countries.



### SAVING $600 ANNUALLY

**When these sand drying drums were flat belt driven, heat and dust reduced belt life to as little as two weeks.**

**The Gates Vulco Rope drives that replaced them are saving the Zigler-Cline Construction Co., Fayetteville, North Carolina, more than $600 annually.**

CS-526-B

Gates® VULCO ROPE DRIVES

THE GATES RUBBER COMPANY • DENVER, U.S.A.

**V-Belts — Hose**
**Molded Rubber Goods**
**for industry**
***World's Largest Maker of V-Belts***

# IT'S THE *Built-in Quality* THAT COUNTS!

*Designed to fit your present resistor space*

**STEEL GRID RESISTORS**
**consistently prove their value in**
**MINING SERVICE**

*Steel Grid Resistors for* COAL MINES *Since 1915*

By use of those durable raw materials . . . steel and mica, and the P-G exclusive features of design, these Steel Grid Resistors have the "built-in quality" to overcome factors which often cause resistor failures. Vibration, moisture laden or corrosive atmospheres have little effect on continuity of service. Try Post-Glover Resistors for heavy duty applications where resistors are subject to severe service . . . continuous "Trouble-Free" performance is assured.

P-G

*The Nonbreakable Steel Grid Resistor*

**THE POST-GLOVER ELECTRIC COMPANY**

•ESTABLISHED 1892•

221 WEST THIRD STREET, CINCINNATI 2, OHIO

# SAVE METAL! CUT YOUR MAINTENANCE COSTS ABOVE GROUND AND BELOW!

# STOP RUST! with RUST-OLEUM

**May be applied directly over rusted surfaces without removing all the rust!**

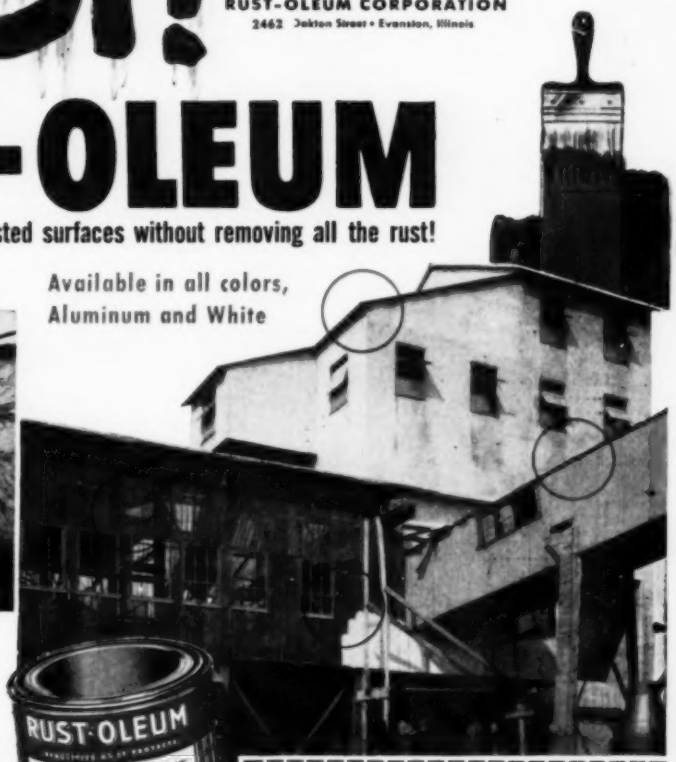
### So Easy To Use That One Man Often Does The Work of Two

Indoors and out, above ground and below—RUST-OLEUM stops rust on your pipes, cars, metal sash, tipples, machinery and surface equipment! Saves time, labor, and money because RUST-OLEUM may be applied directly over rusted surfaces after wirebrushing and scraping to remove rust scale and loose particles. Cuts maintenance costs, too, because RUST-OLEUM *lasts longer* applied over surfaces already rusted. Resists fumes, dust, moisture, rain, snow, and weathering. Beautifies as it protects in all colors, aluminum, and white. Get the facts, today. Prompt delivery from Industrial Distributors in all principal cities, United States and Canada.

**RUST-OLEUM CORPORATION**
2462 Oakton Street • Evanston, Illinois

*Look for this label — be sure it's genuine* RUST-OLEUM

Available in all colors, Aluminum and White



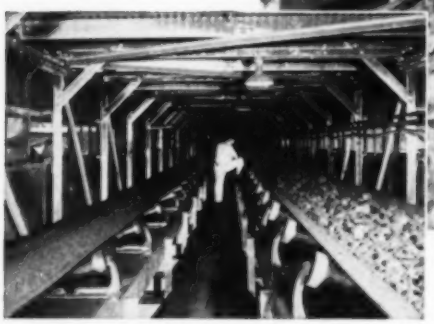

**CLIP THIS TO YOUR LETTERHEAD**

**MAIL TO: RUST-OLEUM CORPORATION**
2462 Oakton Street • Evanston, Illinois

- ☐ Have a Qualified Representative Call
- ☐ Full Details on Free Survey
- ☐ Complete Literature
- ☐ Nearest RUST-OLEUM Source

# 24 U. S. Rubber Conveyor Belts operate in Inland Steel's Price, Kentucky, Coal Preparation Plant

**BELT CARRYING** run-of-mine coal discharging into blending bin through tripper.



**BELT AT LEFT** takes ¼" x 0 raw coal from blending bin to surge bin. Belt at right conveys 5" x ¼" raw coal from blending bin to wash box.

In this modern coal preparation plant, 24 U. S. Giant Conveyor Belts carry run-of-mine coal, fine coal, rock and refuse through the various preparation processes. These belts range from 24" to 54" in width and vary from 37 to 1,786 feet in length—totaling 9,729 feet.

Consult the nearest United States Rubber Company branch office for complete information or write to the address below.

PRODUCTS OF U.S.RUBBER SERVING THROUGH SCIENCE

**UNITED STATES RUBBER COMPANY**

MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

# For Extra Trips—
# Extra Tonnage—
# Extra Safety—

## Keep your haulage
# AHEAD of PRODUCTION
## with the M·S·A
# MinePhone
## COMMUNICATION SYSTEM

Reduces frequency of motormen and snappers getting on and off trips—saves time—avoids injury.

Keeps main line haulage-ways free of traffic tie-ups.

Maintains better control of "empties" for peak loading efficiency.

Coordinates trip traffic for safer, more productive haulage control.

Prevents excessive stop-and-start strain on haulage equipment.

Avoids excessive power loads for more economical operation.

Provides an efficient, time-saving underground "call" system.

Eliminates trip delays necessary when permanent telephone installations are used.

Minimizes chances of error and accidents.

With mechanization increasing production, your haulage system must "keep ahead" to realize maximum tonnage. The M.S.A. MinePhone helps fill this need by providing a modern underground system that maintains smooth, continuous trip movements throughout the mine.

Sending dispatcher's orders instantly and simultaneously to all motormen, who can reply or communicate with each other while trips are in motion, the M.S.A. MinePhone coordinates haulage movements with production demands. Messages, transmitted on an "open line" hook-up, keep the track ahead clear for outgoing loaded trips and incoming "empties."

The M.S.A. MinePhone brings greater underground safety, too. Track conditions, derailments, or roof falls can be reported immediately. Time-consuming calls to each individual are eliminated—a big advantage in emergencies. Write today for complete details on this modern, two-way voice communication system.

MSA
SAFETY EQUIPMENT HEADQUARTERS

When you have a safety problem, M.S.A. is at your service. Our job is to help you.

**MINE SAFETY APPLIANCES COMPANY**
BRADDOCK, THOMAS AND MEADE STS., PITTSBURGH 8, PA.
*At Your Service: 66 Branch Offices in the United States*

**MINE SAFETY APPLIANCES CO. OF CANADA, LIMITED**
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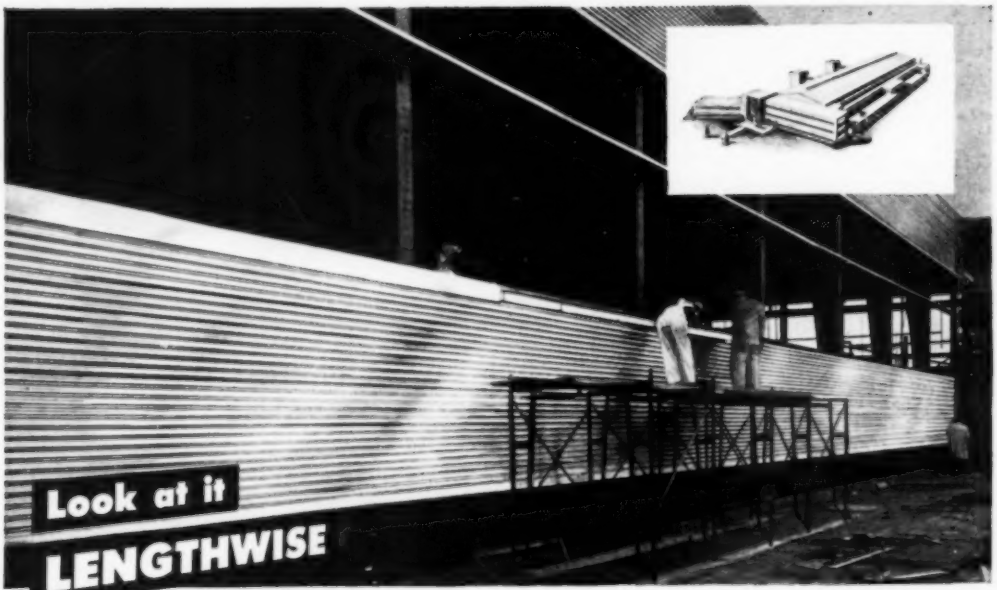
Cable Address: "MINSAF" Pittsburgh




## . . . Longer Life, Lower Maintenance!

When Hytron, Division of CBS, planned its new Danvers, Mass., plant, architects and clients agreed on Reynolds *Lifetime* Aluminum Industrial Corrugated for siding. Low initial cost, long life and lowest maintenance were practical factors. But the architects—R. P. Systems Engineers—sought a design effect, too. So they specified *horizontal* application. General contractor was L. R. Porter Construction Company.

Both as siding and as roofing (vertically applied) this material saves substantially on labor costs. It is light weight, easy to handle... workmen like it. In addition, aluminum reflects radiant heat ...keeps interiors up to 15° cooler in summer and warmer in winter.

Plan your next construction with this high-strength aluminum that never rusts, resists corrosion.

**Call Reynolds for literature and technical assistance...offices in principal cities. Check your classified phone book for our listing under "Building Materials," or write to Reynolds Metals Company, Building Products Division, 2041 South Ninth Street, Louisville 1, Kentucky.**

**Specifications:**

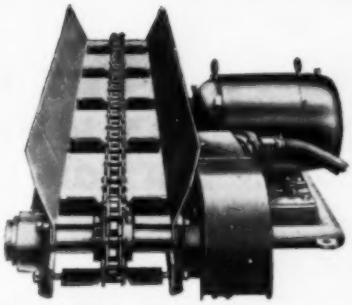
Thickness .032"
Weight 56 lbs. per square
Corrugations 7/8" deep, 2-2/3" crown to crown
Roofing width 35", coverage 32"
Siding width 33-3/4", coverage 32"
Lengths 5', 6', 7', 9', 10', 11', 12'

**Military demands for aluminum limit supply, but Reynolds is rapidly expanding aluminum capacity. Rated orders receive priority handling.**

# REYNOLDS *Lifetime* ALUMINUM INDUSTRIAL CORRUGATED

# Better Engineered CHAINS

. . . Another of the many reasons why there's nothing on the market to match the



# JOY MODEL FA ROOM CONVEYOR

## THREE CHAINS AVAILABLE – A TYPE TO SUIT YOUR NEED

C-60 Chain Parts Showing Double Lock on Chain Pin

Flight for C-60 Standard or Heat-Treated Chain

Flight for H-79 Promal Chain

The Model FA is the last word in Chain Conveyors. It not only brings you the advantages of simple V-belt drive, more efficient speed reducer, 500 lbs. less weight, 4 sq. ft. less base area, and easy reversibility. In addition, three new Joy-engineered chains are available: the C-60 with malleable block links (19,000 lbs. ultimate strength); the C-60 fully heat-treated (25,000 lbs. strength); and the H-79 Promal heat-treated pintle-type chain, which has an ultimate strength of 27,000 lbs.

All three chains have drop-forged flights integral with the link. The H-79 is also available with a detachable flight. Other superior features of FA Conveyors include an exclusive, non-jamming gravity take-up for the chain, and a ball-bearing mounted shear-pin sprocket which continues rotating and cannot damage either the head-shaft or the sprocket bore if the pin shears. ● *Write for Bulletin LD-200.*

*Consult a Joy Engineer*

W&D CL 3005

# JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

# YOU'LL FIND THE LOWEST PRODUCTION COST PER TON WHERE COAL MINING AND COAL PREPARATION OPERATE INDEPENDENTLY

*S-D "Automatics" moving over Surge Bin is one continuous, smooth operation, opening and closing doors automatically.*

*The "Automatic" Drop Bottom car is the only practical method of completely filling a Surge Bin to track level.*

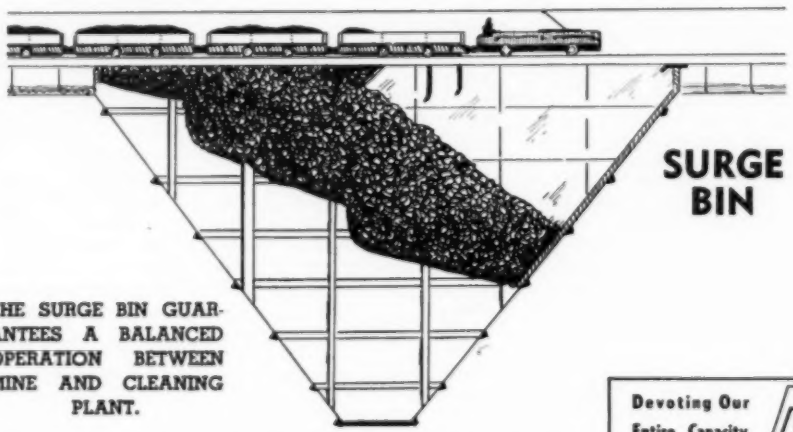
You only have to look around a bit to find the answer to rock bottom production costs of coal. The facts are wrapped up in those mines where mining at the face and the preparation plant can function independently of each other.

The S-D Automatic system of coal transportation from mine to cleaning plant is your guarantee of a continuous, even flow of coal, so necessary to low production costs. This includes an adequate Surge Bin which will serve as a temporary storage of coal in transit . . . the production balancing point between mine and preparation. This Surge Bin plus S-D "Automatic" Bottom Dumping Cars is essential to the low cost, independent working of mine operation and preparation plant.

Any cleaning plant works best, and at the least cost, with an even continuous supply of coal. The Surge Bin continues to supply coal to the preparation plant when, for any cause, there is a delay at the face.

With an adequate surge bin, one shift operation of cleaning plant is often sufficient to take care of two shift operation of mine. Breakdowns or delays at the preparation plant need not stop mine production because the surge bin will take the coal until repairs are made.

For additional facts and details, phone H. W. Sanford, Jr., Sales Manager, 3-4191, Knoxville.




THE SURGE BIN GUARANTEES A BALANCED OPERATION BETWEEN MINE AND CLEANING PLANT.

**SANFORD-DAY IRON WORKS**

KNOXVILLE TENNESSEE

Devoting Our Entire Capacity to the Building of Better Mine Cars for Over— 50 YEARS

# SPEED UP THE JOB . . . BUILD UP YOUR PROFITS

*with*

# Firestone TIRES

WHETHER you make or lose money on many jobs depends on tire performance . . . in rugged rock work, strip mining or heavy earth moving, you need tires specially designed and engineered to withstand torturous abuse.

Regardless of how big or how tough the job, Firestone has a tire that will meet your particular requirement. *You get more for your money with Firestone tires because there is more built into them.* The cut-resistant treads are extra thick and extra tough. The Gum-Dipped rayon cord bodies are reinforced with four extra impact plies. Sidewalls are double-thick, cut and snag-resistant. You get a Lifetime Guarantee with every tire.

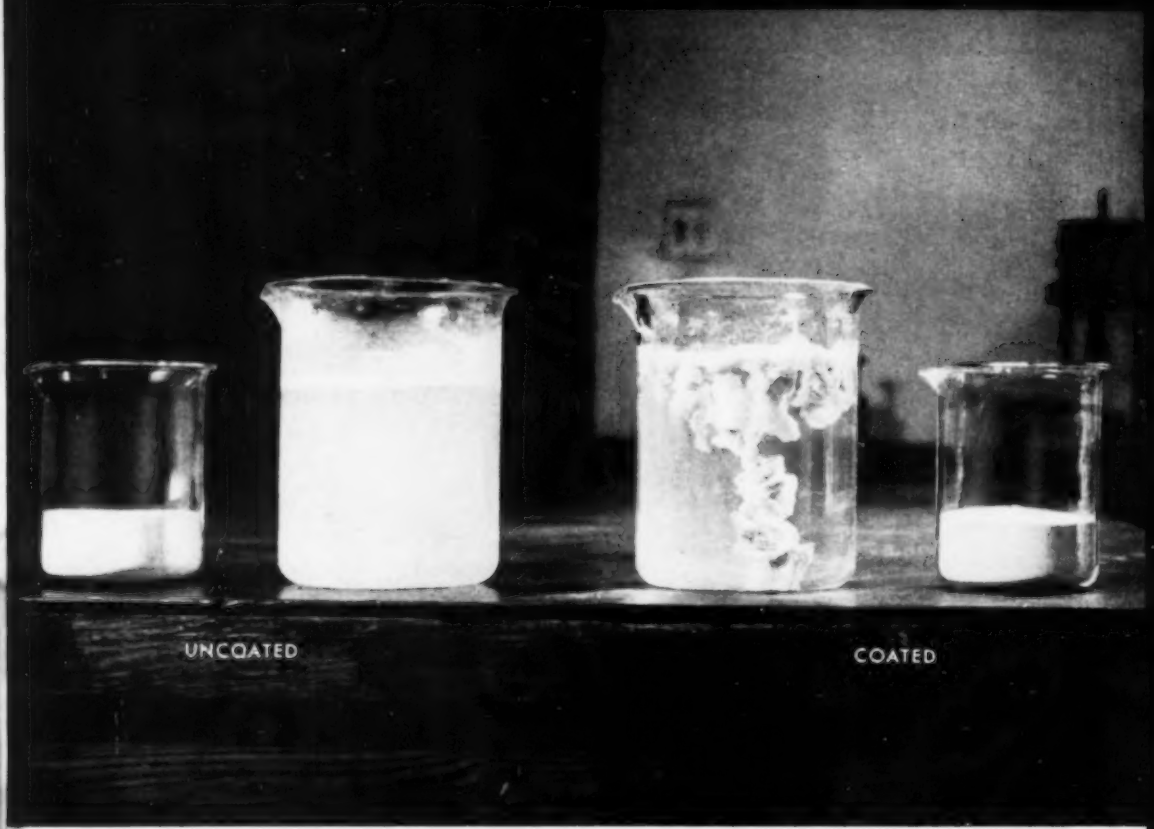
Your Firestone Representative can show you how the right Firestone tire will cut your downtime and build up your profit. Let him show you.

**WHEN YOU BUY NEW EQUIPMENT OR REPLACEMENT TIRES SPECIFY FIRESTONE**

*Enjoy the Voice of Firestone on Radio or Television Every Monday Evening over NBC*

Copyright, 1952, The Firestone Tire & Rubber Co.

# PROGRESS IN EXPLOSIVES . . .




## WHICH BEAKER HAD THE BANG?

The small beaker (left) contains ammonium nitrate. This is an important explosives ingredient, but it absorbs moisture readily. Notice in the large beaker (left)—how it dissolves immediately in water.

The small beaker (right) contains *Hercules* ammonium nitrate *treated with a special resin*. In the large beaker (right) note how the resin-treated ammonium nitrate repels water without affecting explosives' properties.

Here is a simple example of Hercules' pioneering that gives you better blasting efficiency under adverse storage and climatic conditions both in manufacture and in field use.

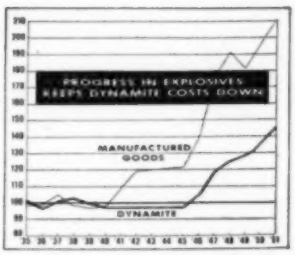



Chart shows relative stability of dynamite prices since 1935, as compared with prices of other manufactured goods. 1935-39 values=100.

**HERCULES POWDER COMPANY**
INCORPORATED
*Explosives Department, 936 King St., Wilmington 99, Del.*

X852-4

# to move more, faster... use more of your engine's hp.

The formula for moving any load at higher average speeds, *for less*, is simple:

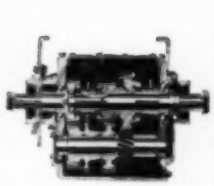
Put your horsepower to work *effectively.*

Every time you lug your engine, or even let it drop below the maximum efficiency range, you lose profits.

That's why the *right* transmission for your "road and load" is so important. That's why so many profit-wise operators specify Fuller Heavy-Duty Transmissions, Fuller Auxiliary Transmissions—and Fuller 10-Speed ROAD RANGER® Transmissions.

For the transmission is where *horsepower goes to work.* And Fuller has proved, time and again, to owner, to mechanic and to driver that Fuller Transmissions gear your rig to use more of your horsepower—to move more, faster, for less.

Illustrated are four of the wide selection of Fuller Heavy-Duty Transmissions. Ask for data on the type and hp. range in which you are interested.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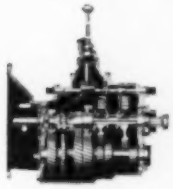
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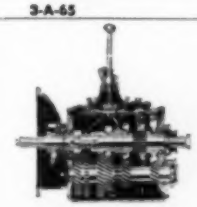
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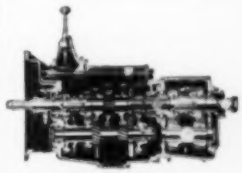
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**FULLER MANUFACTURING COMPANY** (Transmission Division), KALAMAZOO 13F, MICHIGAN

Unit Drop Forge Division, Milwaukee 1, Wis. • WESTERN DISTRICT OFFICE (SALES & SERVICE—BOTH DIVISIONS), 1060 E. 11th Street, Oakland 6, Calif.

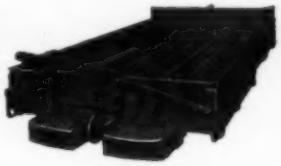
# ENTERPRISE WHEEL & CAR CORPORATION

## *CUSTOM-ENGINEERED MINE CARS . . . . .*

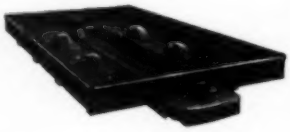
ENTERPRISE CARS are built for the mine—*not for the shop*

ENTERPRISE CARS are built to meet *every* mine specification

ENTERPRISE CARS give you *constant haulage* . . . no serious production delays. Repairs will not affect over-all mine operation



ENTERPRISE WHEELS are not made of ordinary cast iron. Enterprise wheels are made of chilled semi-steel—heat-treated for high tensile strength and shock resistance



ENTERPRISE TRUCKS can be furnished with either straight, tapered or ball bearings. In orders and inquiries, please include information regarding style truck, diameter of wheel and axle, track gauge, and wheel base.

*Your insurance against haulage delays and shut-downs . . .*
*. . . MINE CARS*

An experienced mine car engineering and production organization, backed by 53 years' experience, is at your disposal. Write us your haulage requirements and problems.

ENTERPRISE

**WHEEL AND CAR CORPORATION**
**BRISTOL, VIRGINIA - TENNESSEE**
**HUNTINGTON, WEST VIRGINIA**

**"We're proud of our Coal Preparation Plant . . .**

# . . . it's FAIRMONT-BUILT !!!"

**EFFICIENT OPERATION** — Records from mine after mine show 99%+ separating efficiency!

**LOWEST OPERATING COSTS** — Production records show cost per ton of coal cleaned to be consistently lower than any other system!

**EXTRA WIDE SIZE RANGE** — ⅛" to 10"—PLUS ability to handle coal at operating gravities from 1.35 to 1.65. Washing gravity change-over on Chance Sand Flotation system can be made in five minutes by one man.

"Fairmont-Built" *GUARANTEED* plants can be designed in sizes ranging from 40 tons per hour to 800 tons per hour. For help or advice on your coal preparation problems, call on the FAIRMONT ENGINEERS.

## FAIRMONT MACHINERY COMPANY

"FAIRMONT-BUILT"

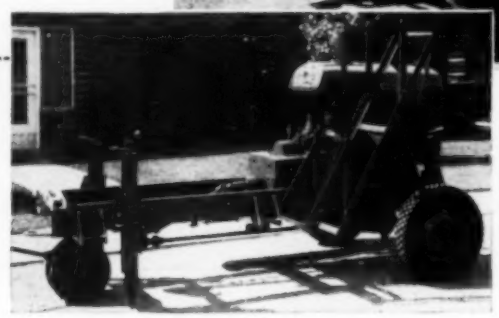
**Fairmont, West Virginia**

Designers and Constructors of Chance Sand Flotation Process for Wet Cleaning and American Pneumatic Separator for Dry Cleaning

# PARMANCO HI-SPEED HORIZONTAL DRILL

## *Completely Re-designed Around a 40 H.P. Engine*

***Drills a 6-inch Hole in two-thirds the ordinary time***



**Included in the new design is an auger rack which saves on drilling time. The augers are on the machine as it is moved from hole to hole. Another feature, for faster set up and smoother drilling, is the four individually adjustable leveling jacks. Automotive steering is optional.**

This HI-SPEED DRILL is designed for drilling 5-6-8 in. holes to 100 ft. or more. The 40 h.p. engine with four drilling speeds makes possible the reduction of footage time by one third. This new drill, the very latest in design, is equipped with self starter and generator, dual type front wheels, truck type rear axle with hydraulic brakes and traction drive with both forward and reverse. Here is greater speed in retrieving augers and four rotating speeds and reverse for drilling and cleaning the hole. Here is accuracy and mobility. Here is the modern answer to faster, lower-cost drilling.

**PARIS MANUFACTURING CO.** PARIS ILLINOIS

# How to avoid application errors at the face–

## use GULF MINING MACHINE LUBRICANT B

**–it does the job of 2 or 3 other lubricants and does it better!**

*Here's why:*

1. Heavy body—reduces leakage from housings and gear cases.
2. Superior lubricating value — insures less wear.
3. Exceptional adhesiveness — prevents throwoff or excessive channeling.
4. Resistance to the washing action of water.
5. Equally effective for bearings and gears.

For additional information on this quality product, call in a Gulf Lubrication Engineer. Write, wire, or phone today. Gulf Oil Corporation · Gulf Refining Company. Offices and warehouses in principal cities in Gulf's marketing territory.

GULF INDUSTRIAL LUBRICATION

# MORE EFFECTIVE SHOTS

**you can plan your shots better when you "Hook up and Detonate with PRIMACORD"**

Using Primacord you get faster, easier loading; the positive firing of every dynamite cartridge in every hole – be they wet or dry; the shooting of as many holes as you wish; the most efficient use of your men and mobile equipment regardless of the terrain or the weather. And correctly hooked up, you can shoot the front holes a split second ahead of those behind, giving you relief from burden and better fragmentation. All of which means easier digging, larger daily yardage.

Your men will like it, too. It's less hazardous – it cannot be set off by friction, sparks, ordinary shock or stray electrical currents . . . yet it fires instantaneously from a blasting cap.

***Plan your shots for bigger payloads with* PRIMACORD**

*Ask your explosives supplier or write us direct for further facts*

**THE ENSIGN-BICKFORD COMPANY**
**SIMSBURY, CONNECTICUT**
***Also Safety Fuse since 1836***

There's a type for every job. **PLAIN PRIMACORD** for shallow holes and surface trunk lines; **REINFORCED PRIMACORD** for deep holes and resistance to abrasion; **WIRE COUNTERED PRIMACORD** for deep, ragged holes; and **PLASTIC REINFORCED PRIMACORD** for deep holes and unusual wet conditions.

## *Use* PRIMACORD®

***The PROVED and APPROVED DETONATING FUSE***

Devoted to the Operating,
Technical and Business Problems
of the Coal-Mining Industry

Coal Age

JUNE, 1952 IVAN A. GIVEN, EDITOR

# Real Goal

A MACHINE can't continue to run smoothly—or even run—without oil. For exactly the same reason, a face operation can't be smooth and efficient without its form of lubricant—good service. The methods and machines used in the not-too-distant past have obscured to some extent the importance of service. Now, the new machines and methods that have come into the mining picture are showing up good service as the important thing it really is, though there still is evidence that its importance is not yet fully realized.

Service means everything supporting the face operation and making it safer and more efficient. It takes in, therefore, haulage, ventilation, power, communication and all the other activities in mining that sometimes do not get the attention they deserve. Maintenance is perhaps the major example of a service that is thought of last and then for not too long a time. Good maintenance, along with good service in other directions, means that the face unit can operate at as near capacity as is possible for the maximum of time. This often means a second increase in efficiency equal to or greater than that afforded by the installation of the new production machines. It's a goal well worth some extra effort on management's part.

# Room for Help

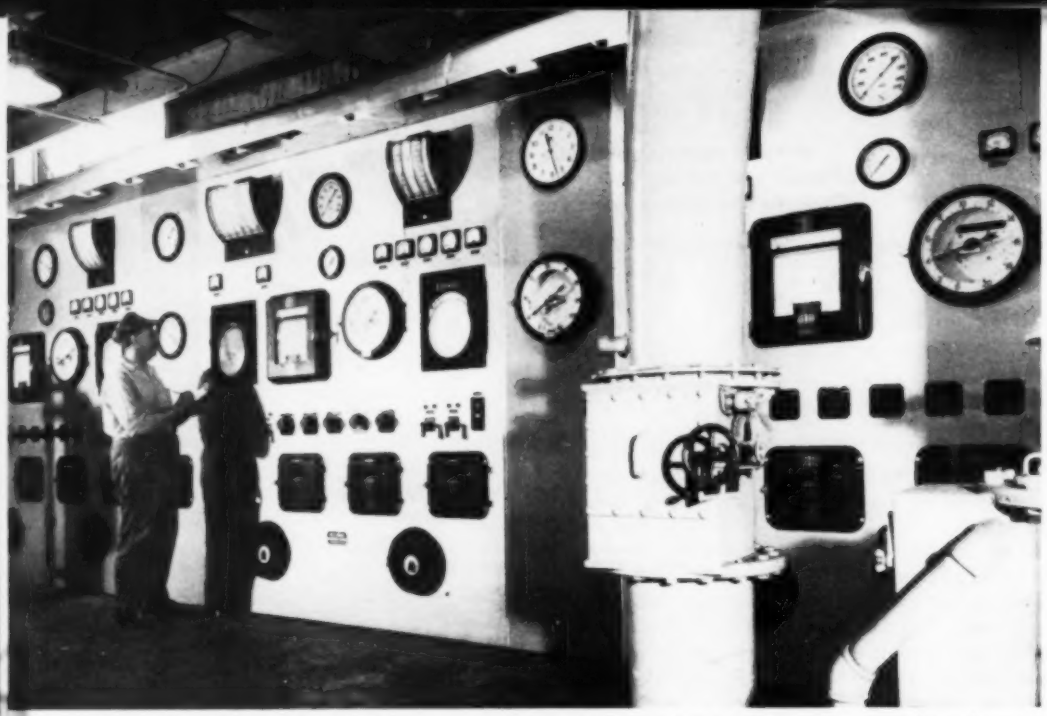
ACCEPTANCE OF RESPONSIBILITY is perhaps the most vital factor of all in any enterprise. There can be no exceptions among owners, managers and employees if maximum success is to be achieved. That still is true even though the emphasis today in government and union circles is on making it appear that employees—along with union officials—have no responsibility, and owners and managers all. While this is bad enough, the pressure in this direction is accompanied by equal pressure toward restricting management's powers to direct and control the efforts of the group, particularly those in the union ranks.

Ominous reflections of this pressure in coal mining include the drive for absolute seniority and direct or undercover efforts by many of those in union or public positions to prevent the imposition of disciplinary action—even for flagrant violations of fundamental safety rules. If workers can do things that experience indicates can cause as many as several hundred deaths in an instant, or if slackers can sabotage an efficient mining layout, management and owners are not the only ones that suffer: so do the workers themselves. What is the conclusion? Union and public officials should address themselves promptly and wholeheartedly to making sure that responsibility is accepted all the way down the line. Management, in addition to doing its full share in this field, should exert every effort to see that the men—and their representatives and public officials—accept their responsibility also.

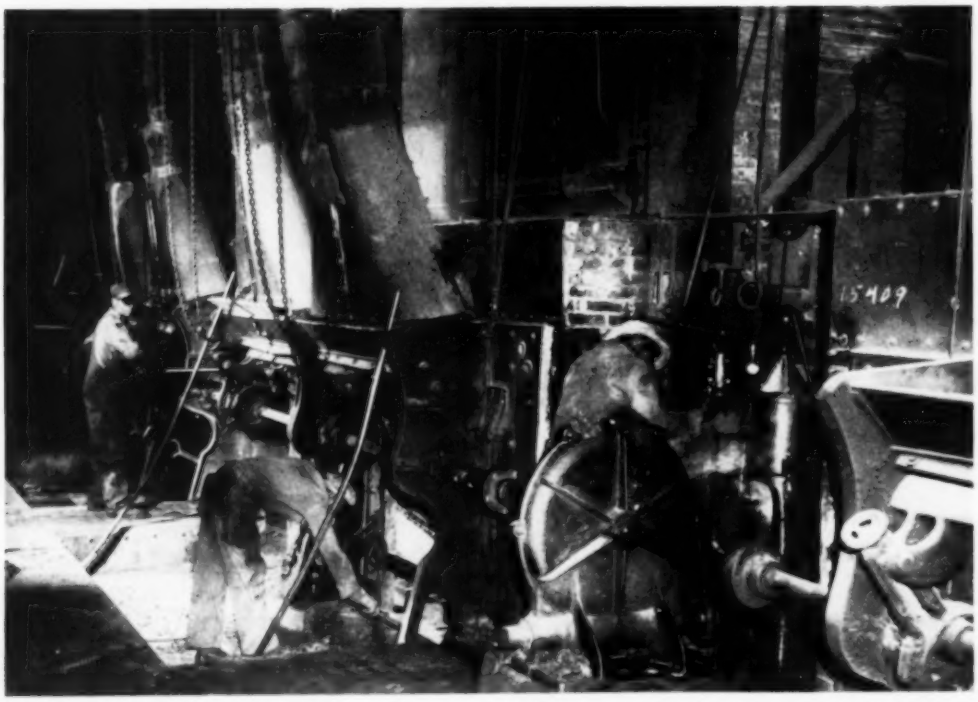
# Another Threat

NATURAL GAS and oil trouble coal in more than one fashion. Not only does coal have to contend with them in marketing; it must work around them in mining almost everywhere. The unlogged, carelessly spotted or inadequately plugged well is a definite threat in mining, and recent developments indicate that this threat is no less than in the past. In addition, mine operations in certain areas are faced with new and unpredictable hazards growing out of repressuring old fields.

It is obvious that where any of these conditions exist mining might be rendered completely impossible for long periods of time if not forever. The procedure is clear. Mine operators should keep an eye on drilling, plugging and repressuring, and should work with oil and gas companies, and with legislative and regulatory authorities, to make absolutely certain that lives and property are completely protected.



**MODERNIZED PLANT had Bureau's design help on fuel tolerances. It replaced . . .**



**TIRED OLD FIRING EQUIPMENT, which was troublesome, costly, dirty and inefficient.**

# How Better Plant Design Builds Coal's Market

**This year, Fairmont Coal Bureau marks its first decade of engineering service to industrial coal users. The Bureau's record shows:**

- **Small- and big-plant users have problems and want help.**
- **Engineering service is the answer to these problems.**
- **Collective action by coal producers can provide that service.**
- **Coal is top fuel choice when backed by skilled engineering.**

"YOU CAN SIT AROUND ALL DAY happy about your big utility market, and all the time your small industrial customers will be changing over to oil.

"Then one day you wake up and see what's happened. You've lost a lot of tonnage in small dribbles, most of which you could have saved if you'd helped your customers out with their coal-burning and engineering problems. When you realize that over half of the industrial coal sold in this country is burned in small plants using less than 10,000 tons a year, you get busy."

That's the thinking that guides the Fairmont Coal Bureau today. It's not to say the Bureau neglects the utility market. It doesn't. Tonnage sold to utilities by Bureau members has increased from 1,428,000 in 1942 to 7,247,800 in 1952. But the Bureau's emphasis gravitates toward the small plant. The results of its long-range program, showing up this year on the Bureau's tenth anniversary, are a measure of the sound thinking and creative imagination that guided the organization through its early years and now are charting its course for the years ahead.

The Bureau's beginning lay in a need to find more markets for the high-volatile, low-fusion coals of the Pittsburgh seam in the Fairmont district of West Virginia. The answer to this need, envisioned as a long-term project, lay in designing flexibility into fuel-burning plants and following through with engineering service. Eastern markets were to be the main target. If the plan worked, these markets would provide an outlet for the slack sizes that filled no-bill cars in the Fairmont district.

The competitive strength of Fairmont Pittsburgh-seam coal in eastern markets lies in low-cost mining. The seam, long known for its top-grade steam-raising qualities, ranges from 5 to 9 ft in thickness in Northern West Virginia. It lies well, with few faults and little pitching. Mine operators, making the most of these conditions, have mechanized their operations nearly 100%. Productivity therefore is high and costs are low—low enough to offset the freight differential between Fairmont coal and coals from Central and Western Pennsylvania and still leave a price advantage on delivered Btu equivalent to 50c to $1.50 in favor of Fairmont coal laid down in Philadelphia, New Jersey and New York State.

To make a still better case for Fairmont coal, reserves of the Pittsburgh seam are abundant. Industrial plants engineered to burn this coal are assured of adequate tonnage in regular supply for years to come. Sulphur content ranges from less than 2% to about 3½%. Volatile matter averages around 36%; ash 7 to 12%; ash-fusion, about 2,000 to 2,200 deg F.

## Off to a Busy Start

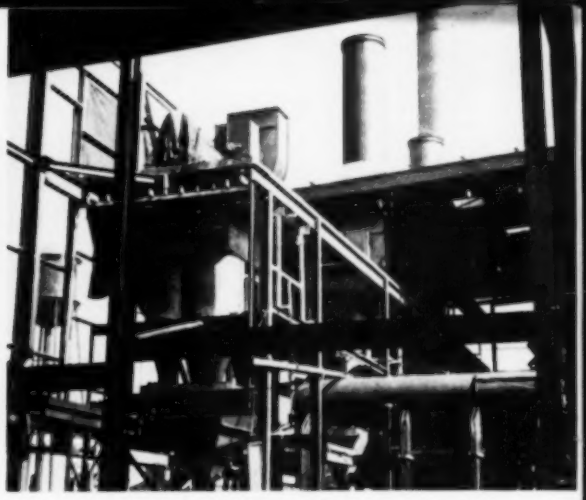
THE BUREAU'S FIRST CONTRACT became effective Jan. 1, 1942. With that, the organization was in business.

It was not a sales agency then, nor has it ever become a sales agency. It is—and always has been—an organization for consultation and engineering service. Some 25 producers representing 62% of Pittsburgh-seam tonnage support the service with a modest budget—a bit over $80,000 in 1952. In the 30's, Pittsburgh coal was about 80% of District 3 output (15,000,000 tons) whereas today, with 31,500,000 tons, it totals 70%. The production trend for the entire district is upward.

Organization took place at a strategic time. In the middle and late 30s, coal users could find abundant supplies of premium high-fusion coals almost anywhere. But by 1942 the market had tightened. Top-grade coals for steam raising were hard to find and the outlook for liquid-fuel supplies was dim. Fuel users therefore were eager for information on availability and utilization of coal.

The Bureau saw its problem in terms of public relations as well as en-

**ASH-STORAGE SILO** in modernized plant is part of automatic system that pares labor and keeps plant clean.



**DUST COLLECTORS** added in up-dating stop flyash and cinder emission and improve user's public relations.

gineering. First step was preparation of a brochure describing the Fairmont field and Pittsburgh coal-mining methods, preparation plants, reserves and transportation. Next, a fuel engineering conference was called at West Virginia University for top engineers of the mining and burning-equipment industries as well as fuel consumers.

A traveling panel of speakers followed through after this conference. This panel, appearing in dozens of cities in the prospective market area, presented the case for sound fuel engineering and Fairmont coal. It also told why flexible fuel tolerances, liberal proportions in furnace and water-cooling surfaces, and ample allowances in stoker grate areas and pulverizer capacities should be designed into steam plants. The group spoke its piece before purchasing agents, boiler and burning-equipment makers and various groups of engineers. The result was establishment of the fundamentals of realistic fuel engineering and economics among the men most interested in fuel-dollar value.

World War II practically halted non-defense construction and modernization. But the Bureau found plenty to do anyhow. Defense plants and the armed forces needed engineering help, and the Bureau provided it. Meanwhile, the Bureau kept on planting the seeds that have since paid off in strong, diversified markets for Fairmont coal. Booklets urging liberal design for fuel equipment were mailed by the thousands to consumers, plant designers and consulting engineers. Space advertising, conferences, group meetings, consultations and personal contacts supplemented the booklets. With its headquarters in New York City, the Bureau was in position to reach equipment makers, consulting engineers, and utility and industrial firms with plants throughout the Nation.

## The Pay-Off Shapes Up

FIRST SIGN OF A BIG TURN in the Bureau's favor came to light in 1943, when Consolidated Edison Co., New York City, spurred by Fairmont engineers, liberalized furnace and pulverizer specifications for two planned additions to the Hell Gate station and opened the way for Fairmont coal when the additions were completed after the war.

The postwar upsurge in utility and industrial expansion and modernization found the Bureau ready to move in. With much of the ground work laid—that is, with engineers, consultants, equipment builders and industrial executives aware of the need for fuel flexibility—the Bureau turned more and more to analytical and economic fuel studies for individual plants. In increasing numbers, the Bureau's recommendations for liberal fuel specifications, passed along to consultants and constructors, were accepted for new plants and additions. By the end of 1947, 600 new units in the Bureau's market area were designed to include Fairmont coal. By July, 1951, the list had grown to 1,500 modern plants capable of burning Fairmont coal.

This latest list, together with older potential markets, adds up to a possibility for 77,000,000 tons a year—18,000,000 to the Lake trade, 12,000,000 competing with low-cost Ohio coals in that field, 6,000,000 in New England, some 33,000,000 in utilities in the Middle and several South Atlantic states and about 8,000,000 in industrial plants in the same area.

In 1951, the Fairmont Coal Bureau's members provided these potential markets with 18,401,400 tons. Considering that over half of these plants having one or more new units still have some old equipment that requires premium coals, that's a pretty good figure. Capture of more of this potential market must await further modernization. Needless to say, Fairmont engineers are seeking to speed this modernization with their expert on-the-spot studies and with their contacts with the men who count. There still is plenty of room to work in. Bureau engineers estimate that about 90% of all industrial plants are not well equipped to handle coal and ashes efficiently.

## Servicing the Small Plant

MORE ATTENTION TO SMALL PLANTS—that has been the major trend in the Bureau's drive in the last two or three years. These are the customers that are easy to lose one by one.

There are two reasons why these small plants tend to drift away from coal. First, they usually are processing or manufacturing plants in which the cost of fuel is negligible in comparison with labor and material costs involved in turning out a product. For that reason, it's easy for executives to overlook fuel costs and turn to a so-called "laborless" fuel. Second, fuel-engineering services usually are not available except at high cost—at best somewhat beyond the ability or willingness of small-plant management to pay. In contrast, big fuel users, like

# How the Bureau Works—Four Case Histories

## Case I—CARPET MAKER:

A carpet manufacturer, thinking he'd save $35,000 a year in labor costs, was about to change from coal to oil. He complained of flyash, grate siftings in the windboxes, frequent shear-pin replacement, too much moisture and too many fines (he was not burning Fairmont coal), and costly labor for handling coal and keeping it moving in the downspouts, as well as breaking up clinkers entering the ash-disposal system. Annual coal consumption in the plant was about 60,000 tons per year.

But before making a final decision, the manufacturer invited a Bureau engineer to come in and talk about fuel economics. The result of this visit was a report comparing total steam costs for the existing equipment and the proposed oil-fired conversion, plus a cost estimate for new coal- and oil-fired equipment.

The report pointed out that much of the trouble came from the type of coal used—a high-moisture, friable coal—and recommended double-screened, low-moisture, hard-structure Fairmont coal for the existing underfeed stokers. This could be delivered at 10c per ton less, on a Btu basis, than the coals being used.

The report pointed out that annual steam costs with existing equipment and the coals then being burned amounted to $628,000. With double-screened Fairmont coal, annual steam costs would be cut to $603,000; with oil in existing equipment, $647,800. Assuming new equipment were installed, spreader stokers, requiring $600,000 capital investment, would provide steam at an annual cost of $528,000 if Fairmont slack coal were used. New oil-fired boilers, at a capital cost of $650,000, using Bunker C oil, would provide steam at $619,000 a year.

Turning to coal and ash handling, the report pointed out that ashes were handled automatically but that, even so, more labor was being used than was customary for manual disposal. The Bureau engineer showed how ash handling costs could be cut from about $4.50 to 65c per ton or less.

Summarizing, the report recommended that existing coal-burning equipment be kept for the time being, with the prospect of saving $27,000 a year from improved ash handling and $25,000 from double-screened Fairmont coal. Later, when money might become available for new equipment, spreader stokers and new boilers were recommended. Savings from the spreader stokers, the report said, would pay for the installation in 4 yr.

## Case II—CHEMICAL PLANT:

The management of a chemical plant in New Jersey was "disgusted" with coal and had decided to turn to oil. It took persuasive talking even to get the Bureau engineer into the plant. But once he got in, he saved a 30,000-ton-a-year customer for coal.

The Bureau engineer found a badly outdated steam plant, complicated by inefficient coal and ash handling and costs far above what they should have been. Management's decision to build a new steam plant, he found, was fully justified. His opening pitch, therefore, was this: Since you're going to build a new steam plant, at least design it so you can turn to coal when you want to. Bituminous, he argued, really is the basic fuel on the Atlantic Seaboard and should be built into the plant whether or not coal is used for initial firing.

The Bureau engineer offered figures showing that the performance of spreader stoker and oil firing would be practically identical in the new plant. He made the point further that smoke and flyash needn't be a problem with the right burning equipment and dust collectors, and showed that only a few simple steps were needed to make coal and ash handling clean.

The basic question, then, was this: Which fuel, oil or coal, will produce steam at lowest cost?

Installation of stokers and flyash collectors, the engineer argued, would mean a capital expenditure of about $75,000 against $100,000 for oil, including burners, pump and heater sets and oil-storage tanks. On the fuel-cost side, he explained, Fairmont coal was over $2 a ton cheaper than residual oil, on a delivered Btu basis. With Fairmont coal, total operating costs would be $287,100 per year against $345,900 for oil.

Knowing that the company probably would not employ a consulting engineer to supervise construction, the Bureau urged the company to insist on strict guarantees and liberal specifications as to the types of fuel the new plant would burn. Furnace volumes and grate areas should be generous, and higher setting heights and larger breechings would be needed to provide fuel flexibility and guarantee satisfaction with low-cost Fairmont coal. Furnace and stoker should be designed for an ash-fusion temperature minimum of 2,000 deg.

Besides making recommendations about new units, the Bureau engineer also took a look at existing underfeed units. The trouble, he found, was poor distribution of coal on the fuel beds. He said he thought the remedy would be simple and offered to make a detailed study if authorized.

The result: Another customer saved for coal.

## Case III—SALT COMPANY:

A salt manufacturing plant posed a two-headed problem for the Bureau—an old steam plant that needed replacing and a new steam plant that was not meeting expectations. The Bureau came into the picture at the request of the operator who provided the coal.

On the replacement question, the Bureau's first step was to analyze the economics of spreader stokers v pulverized-coal burners in terms of the need for some 70,000 lb per hour of steam. With the management leaning toward pulverized-coal burners, the Bureau engineer explained that the company's steam requirements could be filled better with spreader stokers and, besides, investment costs would be less. The Bureau's report was careful to explain that the Bureau "has no interest in the selection of firing equipment except as it relates to promoting the type of equipment that will best satisfy the customer of bituminous coal."

The report also showed how improvements in coal and ash handling would bring savings in labor costs, cutting coal handling, for instance, to as little as 8c a ton. Finally, the report offered a fuel-analysis and fuel-cost study that showed the cost advantage of Fairmont coal, warning at the same time that the proposed new burning units should be designed with ample tolerances for Fairmont coal.

Regarding the new plant that was not performing well, the company complained of stoker-maintenance troubles and difficulty in removing siftings and ash from the plenum chambers, even though premium coals were being used.

The Bureau engineer's investigation showed that, because of a nearby lake, the plant designers had failed to provide pits beneath the stokers to permit gravity discharge of grate siftings. Instead, soot blowers were used

to carry the siftings forward to a sluicing system. Wide changes in the sluicing-system water level sometimes caused flooding of the plenum chamber and, at other times, loss of undergrate air through the sluicing system. In addition, the system allowed siftings to accumulate below the grate. These siftings often caught fire, with visible damage to grates and probable damage to other structural and working parts and air seals. The report recommended a careful search for warpage and other hidden damage.

Since the plant design would permit the use of Fairmont coal, the Bureau submitted figures showing that, on a Btu basis, Fairmont coal would cost 75c a ton less than the coals currently being used.

The Bureau also made recommendations on coal and ash handling. These recommendations included elimination of a fireman's helper, thus making the plant a one-man operation; construction of a concrete silo to replace overhead bunker storage, concrete being 40 to 50% cheaper than the glazed tile often recommended by equipment salesmen; and an increase in the capacity of coal conveyors. Carrying out these recommendations would cost about $25,000, against some $75,000 for other coal and ash handling systems then being considered.

## Case IV—BATTERY MAKER:

Labor-union cussedness sometimes can cause trouble for coal.

The Bureau found that out when it learned that a battery manufacturer was going over to oil, because he had a tough labor problem. Oil, he thought, would solve his problem by eliminating all labor. Besides, his worn-out steam pant needed replacing and he saw a chance to knock off two problems with a single answer.

The Bureau moved into the situation at the request of a member producer. The Bureau stated at the outset that its study would only hit the high spots but that its engineers would be glad to work further in detail with the company's consultants.

The problem, as the Bureau saw it, was to make the new plant so nearly automatic that the union's demands for "made work" would be ridiculous, so clean and laborless that employees would have no complaint about working conditions, and so cheap that a switch to oil would be out of the question.

The Bureau engineer's investigation brought these conditions to light:

1. Boilers some 28 yr old; stokers about the same.
2. A steam-plant operating efficiency of about 56%.
3. Twenty-two men working in the boiler room—an average of 5½ each shift—with coal and ash handling costs totaling about $19,000 a year for a little over 12,000 tons of coal.

Plant engineers and officials were willing to consider four proposals:

Proposal 1—Repairing and using existing equipment.

Proposal 2—Replacing Boilers Nos. 1 and 2 with one new 35,000-lb oil-fired boiler and converting Boiler No. 3 to oil.

Proposal 3—Replacing existing boilers with two 30,000-lb boilers for spreader stoker or oil firing.

Proposal 4—Replacing existing boilers with one 60,000-lb boiler for spreader stoker or oil firing.

The Bureau studied each of these proposals from the standpoint of capital and operating costs and submitted estimates on each—all preliminary and tentative. Figures showing estimated operating costs with fuel oil, premium coals and Fairmont coal were included. On the basis of annual steam costs, the figures showed that modernization under Proposal 4, with spreader stoker, would be cheapest of all, with total costs of $24,940 a year. Proposal 3, with spreader stoker, would cost only $2,210 more per year, with the advantage of flexibility to meet changing steam demands. Proposals 3 and 4, with oil firing, were estimated to cost from $12,460 to $14,410 more than Proposal 4 with spreader stoker. Proposal 1, the report explained, would cost $44,190 more per year than Proposal 4 with stoker.

Recommendations also were made for modifying conveyor systems for coal and ash handling that would keep the plant clean and would reduce costs from the existing figure of $19,000 to $10,400, $4,740 or $1,860 per year, depending upon how many laborers could be eliminated.

The Bureau hasn't won its case yet with the battery maker but it has put coal in a strong position for a favorable decision.

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the utilities, see fuel as a crucial cost item and therefore are usually well staffed with fuel engineers.

The Fairmont Coal Bureau aims to give help where help is most needed. That's in the small plant. In giving this help, the Bureau does a public-relations and engineering job for the entire coal industry and the producers of Pittsburgh-seam coal and, in a narrower sense, opens the way for a direct sales approach by representatives of the Bureau's supporting members.

Cases I, II, III and IV above are only four recent examples of the missionary work the Bureau does in behalf of coal. Its engineers stay busy all the time. In 1951, for instance, they made 163 plant surveys; 71 studies of various operating problems such as coal and ash handling, economic and analytical fuel studies, fly-ash collection and air purification; 16 tests in plants representing new customers for Fairmont coal; 160 contacts with equipment makers; and 250 contacts with consulting engineers.

In addition, the Bureau sponsored a fuel engineering conference in Philadelphia for over 300 engineers and consultants and mailed copies of the proceedings to 3,500 key men in the Fairmont market area; completed and distributed two new technical bulletins, bringing to 14 the total number of bulletins on subjects ranging from flyash collection and stoker firing to coal and ash handling; and started up a periodic newsletter to member companies to keep them posted on what's going on in the Bureau and its market area.

## Making Gains for Coal

HAVE THE BUREAU'S EFFORTS PAID OFF?

The answer is "Yes." Here's the evidence:

1. In the Bureau's early years, its engineers had to knock on doors, hunt smokestacks and look for people who would listen to coal's story. The smokestack hunting now is over and, though Bureau engineers still meet a cold shoulder and a closed mind here and there, most doors are wide open to them. Constructors, equipment makers, consultants and plant operators have learned to respect the advice of Fairmont men. In fact, much of the Bureau's work now comes in over the transom from people who want help with their fuel problems.

2. Information about new plants being built and old coal customers who plan a switch to oil is easier to get than it used to be. The Bureau's friends, cultivated by the best kind of public relations—service and help—pass the word along to Bureau engineers and, from time to time, suggest that neighboring plant operators get in

## These Engineers Make the Bureau Click

**DONALD M. GIVEN JR., fuel engineer—M.E., Ohio State University, 1942. Prewar, engineer with Sperry. With Navy, 1944-46, assigned to Bikini atom-bomb tests. Combustion research at Battelle, 1946-49. With Fairmont Coal Bureau since mid-1949.**

**JOHN B. LAUDIG, fuel engineer—M.E., Lehigh University, 1927. In powerplant operating game for 17 yr. Major in chemical warfare, World War II. Since the war, mechanical engineer for USBM and engineer for power-plant builder. Joined Bureau in 1950.**

**CARL A. MARSHALL, managing director—M.E., University of Florida, 1924. In combustion engineering and coal-sales management since 1929. Heating and fuels engineer with Army. Joined Bureau in 1945 as fuel engineer. In January, 1949, was made managing director.**

touch with the Bureau for help. This information also comes from salesmen of member companies, whose present confidence in the Bureau is built on profitable experience.

3. A big share of the new and modernized steam plants in the Fairmont market area now are equipped to burn Fairmont coal. That's not to say that all of them actually burn it or that all of them burn Pittsburgh-seam coal mined by Bureau members. The point is, they *can* burn it. And if they don't burn it now, they will eventually, when the price pressure gets tough or when oil and premium coals become scarce.

4. A lot of fuel users who once were unhappy with coal now are permanently sold on coal. Bureau engineers have helped them design their new plants and modernize old ones, showed them how to pare coal and ash handling costs, pointed out simple ways to boost plant efficiency, helped them cut steam-raising costs by using low-cost coal and helped them avoid flyash and smoke nuisances.

5. Tonnage-wise, the Bureau's success may be harder to show. Tonnage has moved up and down over the 10 yr of the Bureau's existence from a high of 19,439,158 tons in 1942 to a low of 12,797,212 tons in 1946. Since 1947, the trend has been up, reaching 18,401,400 tons in 1951. But tonnage is not a satisfactory yardstick for measuring the Bureau's job. To measure success, you'd have to know how many fuel customers would have changed to oil and how many plants would have been built for oil alone if the Bureau hadn't moved in. Bureau engineers, as well as coal-producing members who support the organization, are confident that their plan has saved a lot of small-plant tonnage for coal.

### What Makes the Bureau Tick

WHAT DOES IT TAKE to make an outfit like the Fairmont Coal Bureau successful?

Here are the major factors:

**1. Integrity**—The Bureau recommends equipment in terms of the customer's needs, not because it favors one manufacturer over another. For instance, it showed one plant operator how he could install coal- and ash-handling equipment for $25,000 that would do the same job as a $75,000 installation recommended by someone else. Again, it steered one coal user away from pulverized-coal burners because spreader stokers were better suited to the required steam load. In another case, because of particular conditions, Bureau engineers recommended underfeed stokers instead of spreader stokers.

When it's clear that oil can be burned as cheaply as coal, the Bureau doesn't insist on coal. All it asks is that the plant owner, for his own protection, build a flexible plant that will burn coal when the time comes.

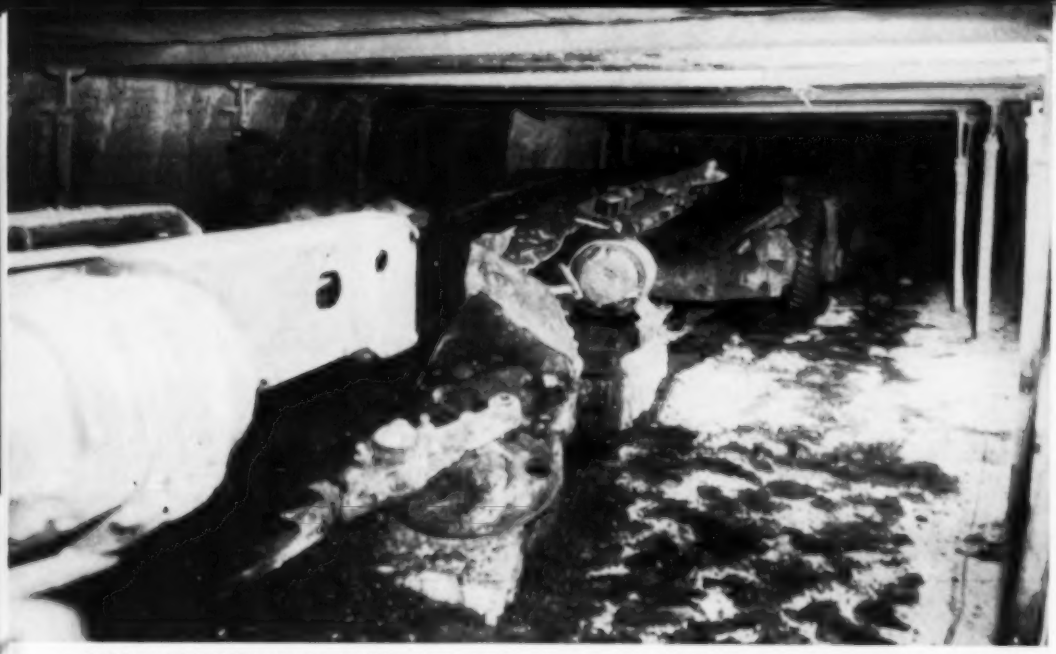
**2. Acceptance of limitations**—With its small staff of three engineers, the Bureau can't provide a detailed plant design except where the plant is simple and small. The Bureau prefers to work with consultants, providing them with basic fuel information and assistance on special problems.

**3. Imagination**—The Bureau tries to see the fuel picture long-range. That means it's not discouraged by periodic ups and downs in the coal market. It believes that the wise way to build future markets is by factual information and good engineering. These ingredients, provided by the Bureau, make receptive customers and give the salesmen of member companies a solid base to build on.

**4. Technical skill**—The Bureau's engineers know their job. That way, they earn the respect of consultants, equipment makers, constructors and plant operators.

**5. Forehandedness**—The time to build coal into a plant is at the blueprint stage, whether it's new construction or modernization. That means Bureau engineers must keep their ears to the ground. They do, with a lot of help from member-company salesmen, from wholesalers and retailers who sell Fairmont coal and from friends they have made.

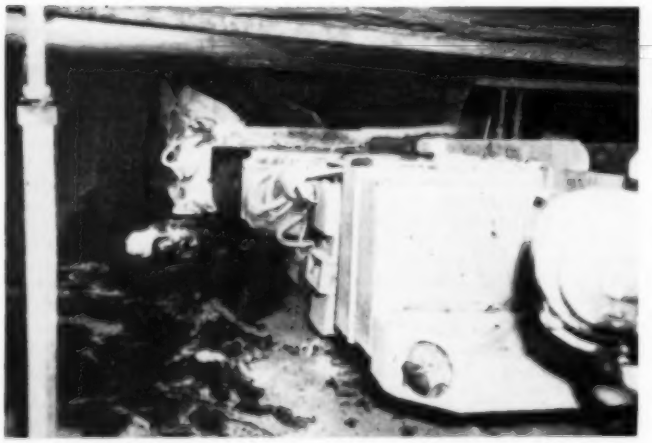
**6. Good public relations**—Favorable public opinion is created by skill, honesty and wide acquaintance. That's how the Fairmont Coal Bureau has achieved friendly, informed relations with the people who count most in keeping coal's market strong.



**GORGAS PRODUCTION-LINE SECRET** is the pickup loader shown here under the tail of the continuous miner. The loader discharges to the shuttle car to complete the initial step in mining and loading.

# Successful Continuous Mining

**How Gorgas Gets 8.65 Tons per man in 4- to 5-ft coal with six continuous miners producing 62% of the output. Pickup-loader system major factor in doubling productivity. Goals are 70% miner tonnage and 10 tons or more per man.**



**ROTARY HEAD** features one of the latest Gorgas miners, shown here mining a crosscut. All other Gorgas machines are equipped with chain-type heads.

THE SUCCESS of continuous mining at the Gorgas mine of the Alabama Power Co., Gorgas, Ala., is measured in part by these figures on tons of washed coal per man-shift, all men on the payroll up to and including the manager of operations:

| | Tons Washed Coal per Man-Day |
|---|---|
| 1948, conventional mining | 4.44 |
| 1949, conventional mining | 5.09 |
| 1950, No. 1 miner in operation Jan. 3 | 6.77 |
| 1951, No. 2 miner Jan. 15; No. 3, Jan. 20; No. 4, Dec. 11 | 7.90 |
| 1952, period ended April 18, Nos. 5 and 6 miners in operation Feb. 11; three of the six machines in headings and aircourses | 8.65 |

## AMERICA 4 DESIGN

Supplying coal for the Gorgas power plant, the Gorgas mine produces pri-

**ROOMS** 16 ft wide and 250 to 300 ft deep normally are completed in less than two days. With undisturbed roof and pillars, wood crossbars on steel jacks provide excellent protection and are quickly and easily installed.

marily from the America seam, with most of the output presently coming from America No. 3 opening. Construction of America No. 4 opening was begun in August, 1951, and it is being projected and equipped for a substantial output—part an addition to and part a replacement of the output of the older openings. In addition to the new opening, Gorgas also has been equipped with a new preparation plant built around a McNally-Norton jig with a capacity of 300 tph and eight Deister Concentrator Super-Duty Diagonal-Deck tables.

Like the others, America No. 4 is a drift opening. Coal thickness in this area is approximately 5 ft, compared to 4 to 4½ ft in America No. 3. Immediately over the coal is an average of 2½ ft of blue or gray shale followed by sandstone. Under the coal is 8 to 12 in of fireclay.

Development at America No. 4 is based on four-heading mains driven 16 ft wide. Three of the headings are driven on 56-ft centers, with a fourth on 40-ft centers. The main line and passings tracks (70-lb rail on Osmose-treated ties) is placed in No. 2 heading from the left. No. 3 is used for gobbing rock taken in brushing for height in the haulage heading. The rock is loaded by conventional loading equipment and is hauled and gobbed by the shuttle cars, with a substantial reduction in cost compared to loading it up and taking it outside for disposal.

Haulage is based on Sanford-Day drop-bottom cars with belts in the panels. Support in haulageways and airways is provided by 30- or 40-in roof bolts and plates. Drilling the holes for bolting has been speeded up and made more comfortable and safer by an improved-type Continental Gin wet rotary bolting unit, shown in an accompanying illustration and developed from an original machine designed by Paul Glaze, assistant superintendent and chief electrician on the Gorgas staff, headed by H. M. Johnstone, manager, Gorgas mines, and Dr. Milton H. Fies, manager of coal operations at Alabama Power Co. headquarters at Birmingham.

**CHAIN FEEDERS** (shown here) and elevating conveyors transfer coal from shuttle cars to panel belts, speeding up shuttle-car discharge and reducing belt wear.

## SIX MINES WORKING

With the addition of Nos. 5 and 6 machines on Feb. 11, Gorgas became one of a very few operations to have

## Mining plan and auxiliary units tie in with miner operation . . .

**PANEL BELTS** have sufficient capacity to serve two miners if desired. Roof-bolting protects openings.

**NEW-TYPE** wet rotary machine speeds roof-bolting and is easy to move from location to location in the mine.

**TABLE I—How Six Continuous Miners Performed at Gorgas in March, 1952**

| Miner No. | Time Lost, Hr-Min | Time Operated, Hr-Min | Total Tons | Average Tons Per Man-Shift |
|---|---|---|---|---|
| DAY SHIFT: | | | | |
| 1 | 34:11 | 112:49 | 7,438 | 50.6 |
| 2 | 43:07 | 103:53 | 8,067 | 54.9 |
| 3 (D) | 44:50 | 102:10 | 6,013 | 41.2 |
| 4 (N) | 53:28 | 93:32 | 6,164 | 40.8 |
| 5 (N) | 40:22 | 106:38 | 6,403 | 43.6 |
| 6 (N) | 43:47 | 103:13 | 6,874 | 47.1 |
| Total | 259:45 | 622:15 | 40,959 | 46.3 |
| NIGHT SHIFT: | | | | |
| 1 | 31:54 | 115:06 | 7,584 | 51.6 |
| 2 | 36:51 | 110:09 | 8,369 | 56.9 |
| 3 (D) | 55:15 | 91:45 | 5,311 | 35.6 |
| 4 (N) | 58:27 | 88:33 | 5,655 | 38.5 |
| 5 (N) | 45:29 | 101:31 | 5,937 | 40.4 |
| 6 (N) | 30:43 | 116:17 | 7,087 | 51.7 |
| Total | 258:39 | 623:21 | 39,943 | 45.7 |
| Grand Total | 518:24 | 1,245:36 | 80,902 | 46.0 |

D indicates development unit; N indicates new unit.

as many as six machines in one property operated as a unit. All machines are Joy 3-JCM units. Five are equipped with chain-type heads and one with a rotary-type head.

Performance of these six miners which, at the time this article was prepared, were accounting for 62% of the output of the Gorgas mine, with the remainder coming from five standard Joy units, is shown in Table 1. In 1951, with three machines, the miners produced 47% of the total output and eight Joy units the remainder.

Ultimate production with the miners is expected to reach 70% of the total. Standard Joy units loading onto chain conveyors and then to mother belts will be retained for development and also for mining certain panel areas where the top is bad as a result of thin cover under creek beds or for other reasons.

A major reason for loading-machine mining in bad-top areas is ability to roof-bolt without undue interference with production (crossbars and jacks are used with the miners). With the loading machines, bolts are installed as soon as one side of the place is loaded out and bolting follows directly behind the loader as it cleans up across the face. Bolts consequently are carried to within 2 ft of the face during loading and all subsequent operations. As a result, roof falls are almost completely eliminated and with them roof-fall injuries.

As shown in Table I, with one of the six miners in development, three others being operated with relatively green crews, and car service hampered because of handicaps growing out of the construction of the new preparation plant, the six machines operated 1,764 hr, or 252 shifts. Time lost for various reasons aggregated 518 hr 24 min, or 29.4%. Nevertheless, output per machine-shift in this period (March, 1952) was 321 tons, and output per man on the crew was 46.0 tons per shift, ranging from a low of 35.6 to a high of 56.9 tons.

Average advance per machine is 125 to 130 ft per shift 16 ft wide, which means that a normal room is worked out in 2 shifts or less. Maximum advance to the time this description was prepared was 187 ft 16 ft wide in one shift, yielding 526 tons of coal.

Substantial benefits have been realized in addition to the reduction in labor cost. In roof support, for example, all places would have to be bolted completely, increasing the consumption of bolts materially and involving substantial labor. With the miner, support is provided by crossbars and timber jacks, which are quickly installed by the crews themselves and can be salvaged almost completely for use in additional places.

The bars, incidentally, are primarily an added safety precaution, since miner operation leaves both the roof and pillars in their original state. Consequently, trouble is seldom encountered in the short time the machine is in the place.

Improvement in top and in roof support also have been reflected in a major reduction in injury cost. There were no roof-fall injuries in 1950 and

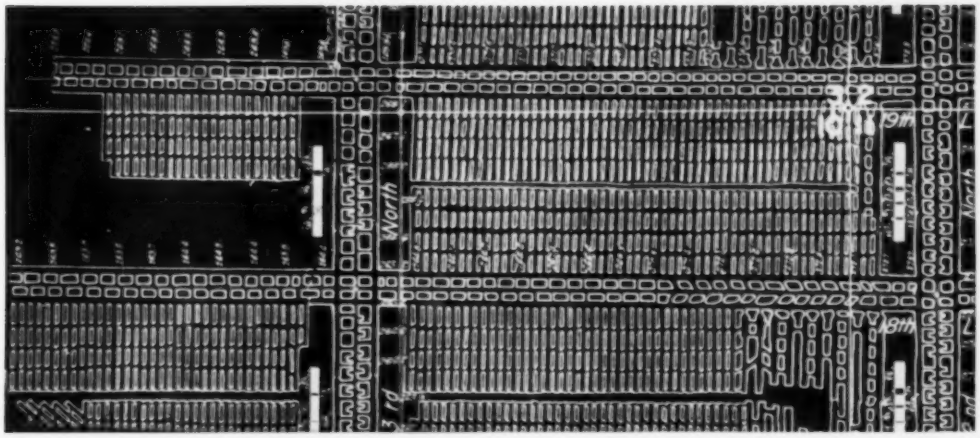


FIG. 1—**TYPICAL CONTINUOUS-MINER PANELS** at Gorgas. Rooms normally are 16 ft wide and 250 to 300 ft deep, and are mined on one side of the panel on the advance and on the other side on the retreat.

1951. Pre-miner injury cost ran 11c per ton. Now, it is down to 1.8c per ton total cost for all injuries. Explosive cost is another item well on its way down. Before the miners were installed, it was running 7.3c per ton. In 1951, with three miners operating, it dropped to 4.7c per ton, and with six in operation is scheduled for another big cut in spite of an increase of 10% in direct cost of explosives.

## PICKUP LOADING

Six basic principles and one specific change in practice underlie the efficiencies being attained with the miners at Gorgas. The basic principles are:

1. Good supervision.
2. Good haulage.
3. Good ventilation.
4. Good voltage.
5. Good maintenance.
6. Good housekeeping.

The specific action taken to increase miner output was the institution of the pickup-loader system. Service with the first machine was based on use of a surge car and shuttle car, driving places 16 ft wide and 260 ft deep, with the shuttle car discharging to a mother belt. Time studies quickly showed that delays were excessive and, consequently, a loading machine was put behind the miner and the surge car was returned to regular haulage.

No. 1 miner, as indicated previously, went into service Jan. 3, 1950. The pickup loader was inserted in the production line late in May. Table II shows the result. Tons per man in the crew jumped from 37.7 per shift in May to 47.3 in June, 1950, and continued to climb the remainder of the year.

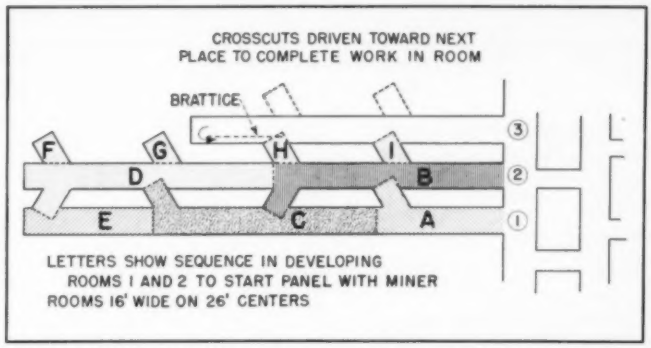



FIG. 2—**PAIRS OF ROOMS** are driven to start a panel, the miner alternating as shown. Then rooms are driven one at a time, with the final operation consisting of crosscutting toward the next place.

**GORGAS MANAGEMENT**—T. L. Austin (left), superintendent; H. M. Johnstone, manager, Gorgas mines; Bert Sims, general mine foreman; and Paul Glaze, assistant superintendent and chief electrician.

## Daily and monthly reports pinpoint time losses, output and costs . . .

JOY CONTINUOUS MINER TIME STUDY

Date _____ By _____

No. _____ Place _____ Shift _____

| TIME LOST | | | | | | | | | Total Time Lost | Total Time Operated | Total Time |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Shuttle Car | Pinning | Timbering | Moving | Breakdown | Power | Water | Changing Bits | Oil & Grease | | | |
| Hr. Min. | Hr. Min. | Hr. Min. | Hr. Min. | Hr. Min. | Hr. Min. | Hr. Min. | Hr. Min. | Hr. Min. | Hr. Min. | Hr. Min. | Hr. Min. |
| | | | | | | | | | | | |

Progress: _____ ft. hdg. _____ ft. A.C. _____ ft. x.c. _____ ft. room

Total Feet _____

No. Train Cars _____
No. Shuttle Cars _____
Approx. tons per car _____
Approx. total tons _____
Tons per man day _____

Report below only breakdowns.

| No. Men | | Time | Amount |
|---|---|---|---|
| _____ | Foreman | _____ | _____ |
| _____ | Operator | _____ | _____ |
| _____ | Operator Helper | _____ | _____ |
| _____ | Shuttle Car Operator | _____ | _____ |
| _____ | Joy Operator | _____ | _____ |
| _____ | Car Trimmer | _____ | _____ |
| _____ | Others | _____ | _____ |
| | | Total | _____ |

Cost Per Ton _____

Pinning: No. Pins _____

| No. Men | Classifications | Time | Amount |
|---|---|---|---|
| _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ |
| | | Total | _____ |
| | | Grand Total | _____ |

Operator _____

FIG. 3—**DAILY REPORT**, or time study, for miner at Gorgas emphasizes time losses, progress, production and cost.

JOY CONTINUOUS MINER TIME STUDY

Date _____

| | Day Shift | | | Night Shift | | |
|---|---|---|---|---|---|---|
| No. | Place | Tons | Cost | Place | Tons | Cost |
| 1 | | | | | | |
| 2 | | | | | | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |

Remarks _____

FIG. 4—**SUMMARY** of daily results for six miners shows places in which the machines operated, and tons and cost.

## TABLE II—How Pickup Loader Jumped Tons per Man with the First Continuous Miner — Jan. 1-Dec. 31, 1950.

| | Number Men | Number Shifts | Total Tons | Tons Per Man |
|---|---|---|---|---|
| January | 58 | 11 | 1,714 | 29.6 |
| February (strike) | ... | ... | ... | ... |
| March | 250 | 36 | 7,390 | 29.6 |
| April | 301 | 40 | 11,352 | 37.7 |
| May | 335 | 46 | 12,629 | 37.7 |
| PICKUP LOADER INSTALLED | | | | |
| June | 210 | 30 | 9,951 | 47.3 |
| July | 216 | 32 | 9,413 | 43.6 |
| August | 323 | 45 | 14,190 | 43.9 |
| September | 267 | 40 | 12,684 | 47.5 |
| October | 310 | 44 | 15,130 | 48.8 |
| November | 305 | 42 | 15,001 | 49.2 |
| December | 280 | 40 | 14,375 | 51.3 |
| Total | 2,855 | 361 | 123,829 | 43.4 |

With the pickup loader, the miner operator merely sets his machine on the centerline and goes to work. He is never required to look back or juggle his rear conveyor, since the responsibility for getting the coal away then becomes that of the men operating the shuttle cars and the high-capacity loader. Frequently, the miner dumps directly onto the loader head. But if there is any interruption in the service, the coal is discharged to the floor, which acts as a surge bin. Later, the loader, with its higher operating rate, cleans it up and moves back up under the tail of the miner.

### MINER OPERATION

Unit makeup with the continuous miner is as follows at Gorgas:

One Joy 3-JCM miner.

One Joy 12-BU loading machine.

Two Joy 6-SC shuttle cars, average 3½-ton capacity, four-wheel drive and steer.

One 30-in Goodman, Ladel, Continental Gin or Transall belt conveyor. The 30-in conveyors were selected to provide the necessary capacity when it is desired to serve two units with the same belt.

One Joy elevating conveyor or chain-type feeder conveyor for transferring the coal from the shuttle cars to the belt. These speed up shuttle-car discharge and also reduce belt wear and coal spillage.

The standard crew for a miner unit is:

One miner operator.
One helper.
One loader operator.
Two shuttle-car men.

JOY CONTINUOUS MINER TIME STUDY
GORGAS MINES

Month of_____, 19____

| Date | No. Men | Shuttle Car | TIME LOST: Pinning | Timbering | Moving | Breakdown | Power | Water | Change Bits | Oil & Grease | Total Time Lost | Total Time Operated | Total Time | No. Feet Advanced | No. Shuttle Cars | Tons Per Car | Total Tons | Tons Man Day | Total Cost | Cost Per Ton | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | | | | | | | | | |

**FIG. 5—MONTHLY SUMMARY** emphasizes delays and shows progress, production, tons per man-day and cost.

One car trimmer at the belt discharge.

One electrician.

One foreman.

On the third or maintenance shift, following the two producing shifts, an additional electrician and helper lubricate and inspect the equipment, and adjust and make minor repairs.

Rooms are driven 16 ft wide, with crosscuts every 70 ft. Room centers are 26 ft, leaving 10-ft pillars, which are left in place. Recovery in rooms is 75%; over the room panels, 65%, provided some form of trouble does not force leaving extra coal. With the improved roof conditions, such trouble is seldom encountered.

A typical area in America No. 3 worked out by the miners is shown in Fig. 1. The panels are opened by three-heading entries with the mother belt in the center. Normally, rooms up to 250 to 280 ft in depth are worked on one side on the advance and on the other side on the retreat. However, the belt conveyors have sufficient capacity, as noted, to permit working a unit on each side, if desired, although it concentrates a large horsepower in a small area. Number of rooms per panel normally is 108, or 54 on each side.

The method of driving a pair of rooms to start a new panel is shown in Fig. 2. As indicated, the miner drives 70 ft in No. 1 room and makes the crosscut. He then moves over and drives No. 2 room 140 ft, making the second crosscut in the opposite direction. He then alternates driving and crosscutting until the desired depth is reached. Finally, he drives the necessary crosscuts from No. 2 room toward No. 3. After that, he drives No. 3, picking up the crosscuts in order and again crosscuts toward No. 4, repeating this process until all the rooms on that side of the panel are worked out.

Brattice lines are used to direct the air to the face, with the goal always to have fresh air travel up over the equipment line and return to the worked-out places behind the brattice, which is moved up from crosscut to crosscut, as indicated in Fig. 2.

Extra protection in continuous-miner rooms is provided by 3x8-in by 14-ft wood crossbars set on Simplex roof jacks on 4- to 5-ft centers. These bars are set by the miner operator and helper. When a place is completed, the bars and jacks are stacked in the nearest crosscuts already turned to the next place. During the process of removing the bars, and while the miner is starting the next room, the loader and one shuttle car clean up the old place, reclaiming 15 to 20 tons of coal in about 30 min of work. Finally, the place is given a final coat of rock dust, using a Canton "Mighty Midget" rockduster carried in the shuttle car.

Cleaning up spillage, in fact, is made an integral part of regular miner operation. In other words, with every 15 ft or so of advance, the loading machine drops back and cleans up. In addition, the helper on the miner and the Joy operator shovel out from behind the jacks and elsewhere along the rib. One result is greatly reduced trouble in shuttle car operation by eliminating heavy thicknesses of loose coal on the bottom. Keeping places clean also contributes to increased efficiency overall.

## MAINTENANCE EMPHASIZED

Good voltage at the face, as previously noted, is a major factor in operating results. In addition it contributes significantly to lower maintenance. The problem of maintenance of production units—and particularly the continuous miners—also is attacked by keeping an electrician with each one during the working shift, with an additional electrician and helper to lubricate, inspect and make minor repairs on the third, or non-operating, shift.

Experience has shown that under Gorgas conditions the miners should be completely overhauled every 6 mo. Main gear cases for the 65-hp head drives are gone into every 3 mo. Otherwise, the mechanical delays begin to mount up. Chains for the heads were a big problem in the early days. Now, the Cincinnati chains presently being employed, with SM-2 bits, have eliminated much of that trouble, and leave hydraulic hoses as the major difficulty from the mechanical end.

Record-keeping for efficiency starts with a daily report made by the foreman. (Fig. 3). Time lost is emphasized and the report is organized so that it is easy to allocate the losses. In addition, the report shows performance, manpower and labor cost. These daily reports then become the basis of daily and monthly summaries (Figs. 4 and 5) for top management at the mines and at headquarters, spotlighting progress as well as difficulties and why they are occurring.

**COAL MOUNTAIN PLANT,** with 16x40-ft carbon addition outlined. Only change in preparation was routing 3/16x0 to predrier and air table.

**FLASH-DRIER COLUMN** (left) elevates coal. Furnace by-pass stack is at right.

## New Red Jacket Plant Addition . . . Uses Flash-Type Predrier

# Reducing Moisture and Ash

**Market value upgraded about $1.50 per ton in one-man carbon-cleaning addition featuring predrying to enhance air-cleaning results. Fuel costs eliminated by firing drier furnace with pulverized waste.**

"EVERYONE SEEMS PLEASED—the operating officials, sales department and equipment manufacturer," was an operator's observation which sparked a *Coal Age* editorial visit to the 40-tph carbon-drying-and-cleaning addition to the preparation plant of No. 12 mine, Red Jacket Coal Corp., Coal Mountain, Wyoming County, W. Va. Before air cleaning, the coal is predried in a Raymond flash drier heated with pulverized waste fuel—a firing method new to flash driers used in coal preparation in this country.

Ability of this type of drier to serve as an elevator was a deciding factor in its selection. From the drier collector, the coal goes through the plant by gravity, except for two short screw conveyors that move it horizontally from the raw-coal conveyor discharge to the drying column. Roberts & Schaefer designed and built the carbon-processing plant.

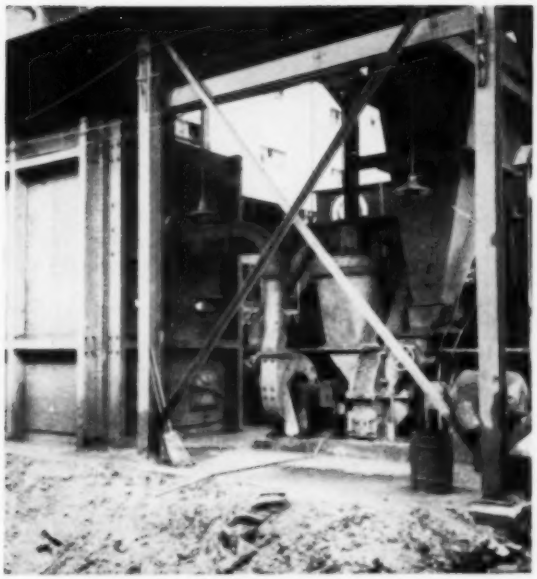
### SAME BASIC PREPARATION

Until this addition was made about a year ago, preparation at No. 12 was as follows: R-O-M discharged by an aerial tram flowed over a 6-in-round scalping screen and the large slate was picked out. The plus 6-in was crushed and, together with the minus 6-in, sent over a 6x16-ft Ripl-flow screen removing the 3/16x0. The oversize, 6x3/16-in, was cleaned in a Baum jig. Wet degradation (1/8x0) from the washing process joined the raw 3/16x0 and was conveyed by an 18-in belt across the creek to the tipple where it was loaded raw.

None of this equipment has been changed, except that the 18-in belt now discharges into the screw conveyor feeding the flash drier. Plan dimensions of the new addition are only 16x40 ft and its area overlaps what was formerly floor space of the tipple. Height of the new plant is 90 ft above the rails.

### CARBON PRODUCT UPGRADED

The coal is from the Dorothy seam and moves into both industrial and domestic markets. Both the mine roof and floor are of soft materials and the seam contains a thin parting in some sections. All the output is mechanically loaded. Its location near the top of the mountain makes the seam rather wet, and in marketing the 3/16x0 the high moisture content was as ob-



**PULVERIZER AND FURNACE** are automatic and are protected only by a roof. Dust for feed minimizes power needs.

**AIR TABLE,** using predried feed, consistently reduces ash 6 to 9% to enhance market value.

### . . . Fired by Pulverized Waste . . . To Raise Air-Cleaning Efficiency

# Upgrades 3/16x0 for Market

jectionable as the high ash. Steam plants burning powdered fuel could not handle the high-moisture carbon in the pulverizers. By removing the moisture and lowering the ash, the new plant addition has upgraded the carbon to the tune of about $1.50 a ton. The drier is run at such low temperatures that there can be no deterioration of the coal.

The furnace, with a Raymond coal pulverizer also furnished by Combustion Engineering-Superheater, Inc., is at ground level and is protected only by a sheet-metal roof. Firing is automatic and the furnace controls and drier instruments are located on an upper floor near the air table and electrical-control center. Only one man is needed to operate and maintain the carbon plant.

An upward velocity of 5,000 fpm is maintained in the 30-in column of the Raymond flash drier by an exhauster blower on the atmospheric-discharge side of the cyclone collector into which the drier column discharges.

#### MOISTURE GREATLY REDUCED

Coal fed to the column contains 10 to 15% moisture and, on leaving, has 2 to 3%. In making this reduction, gas temperatures are 400 to 450 deg F at the column intake and 125 to 150 F at the discharge as measured between the cyclone and fan. It is not conceivable that these low temperatures can adversely affect the quality of the coal. Dust collection in the drier cyclone is facilitated by use of a Crites tube in the center having an opening adjustable for height, through which a portion of the dust-laden air is recirculated to the intake by a small auxiliary blower.

From the bottom of the drier cyclone, the coal drops through an air lock to a 15-ton surge bin, from which it is fed by a reciprocating plate to the air table, a Roberts & Schaefer 6x12-ft Super-Airflow unit. The table makes four products: clean coal, middlings, refuse and dust, with the latter caught in a cyclone collector. The middlings product moves over an 3x8-ft Allis-Chalmers Aero-Vibe screen, from which the minus 10-mesh is discharged as final refuse and the plus 10-mesh recirculated to the table.

#### PLANT FUEL COSTS NOTHING

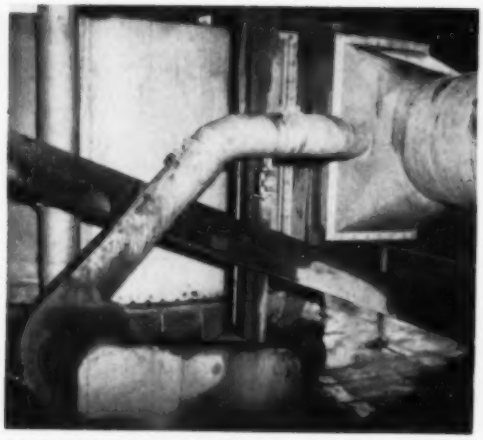
Dust collected from the table cyclone goes to the furnace pulverizer. It contains around 30% ash and would be discarded as final refuse if it were not burned in operating the drier. The dust totals 2.7% of the raw feed to the carbon plant and is sufficient to supply the furnace. Thus fuel for the plant costs nothing. Cost of power to operate the pulverizer is small because of the fineness of the feed.

#### ASH REDUCTION LARGE

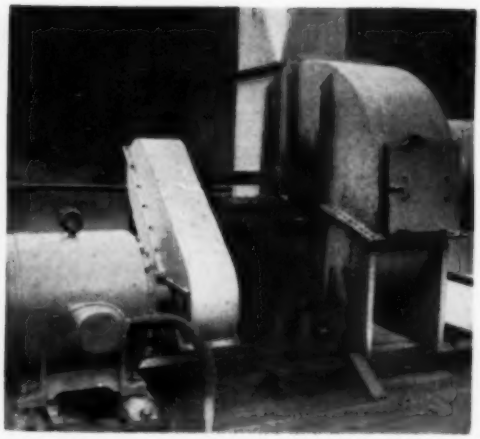
Ash reductions made by the plant range from 6 to 9%, depending on percent of ash in the feed. Consistency in the final product is one of the plant's big advantages. Most of the predried and air-cleaned carbon is loaded direct and practically all of it goes to pulverized-fuel plants.

Some 1½ to 2 tons of the 40-tph feed is 1/8x0 degradation sludge from the washer.

Degradation, if any, in the flash drier is not a consideration, since the coal goes to the pulverized-fuel market. Ash from the high-refuse dust



**PART OF DUST-LADEN AIR** is recirculated from center of drier column to intake with a small blower (foreground).

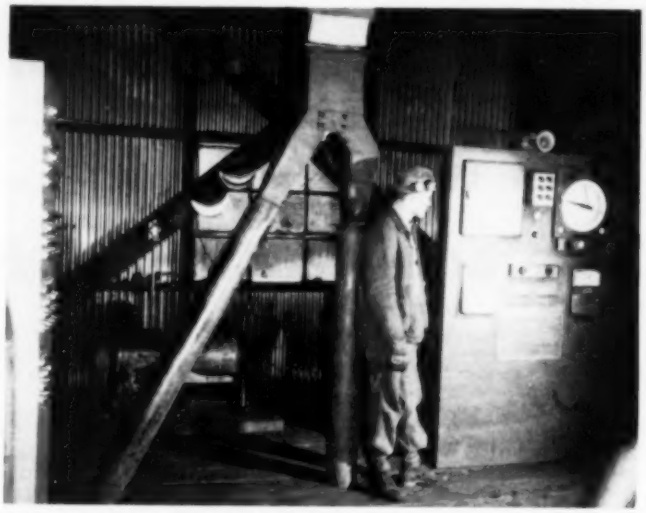


**HOT GASES** are pulled through drier and its cyclone collector by an exhausting blower driven by a 100-hp motor.

burned in the furnace appears to have no detrimental effect. Most of it settles into the bottom of the furnace.

Connected horsepower of the carbon plant is 230 and motors are Westinghouse totally-enclosed fan-cooled units. The larger ones are Type CS and the smaller are "Life-Line" motors. Starters, also Westinghouse, are grouped in a small Transite-lined room.

Coal Mountain No. 12 is one of seven plants operated by the Red Jacket Coal Corp. Six of them are in southern West Virginia and the seventh is in Buchanan County, Virginia. Total shipments during 1951 were 3,746,355 tons. Operating management is concentrated at Red Jacket under direction of William M. Ritter, vice president and general manager. J. F. Maurice is chief engineer; C. P. Ferguson, preparation manager; and Irving M. Craig, preparation engineer. At the Coal Mountain operation, E. F. Smith is superintendent; Don Shields Sr., tipple foreman; and Don Shields Jr., operator of the carbon-processing plant.



**CARBON PLANT'S ONE OPERATOR,** who handles maintenance and checking of furnace, looks at drier-temperature charts. Electrical-control center for plant is at left.

★ ★ ★ **So You Want to be a Manager** ★ ★ ★

***"Management, in the broad sense, is made up of people who are aggressive enough and have enough sense of responsibility to mind not only their own but also other people's business. They feel strongly enoug habout the importance of things being done right to assume direction of them. They do things because of this feeling that they wouldn't do just for money. They are willing to see action taken on their decisions and, if trouble comes, they are willing to take the consequences."***

**J. G. Pleasants**

**Vice president in charge of manufacturing, Procter & Gamble**

★ ★ ★ ★ ★ ★

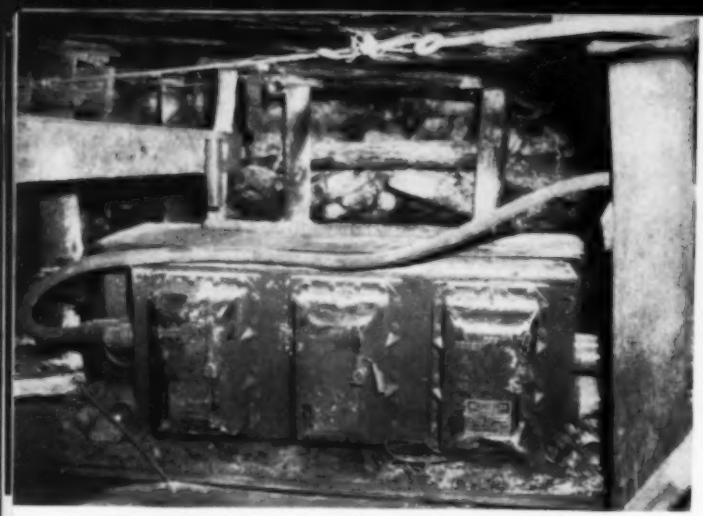
## Where Does Your Property Stand Among . . .

# The 50 Largest Mines in 1951

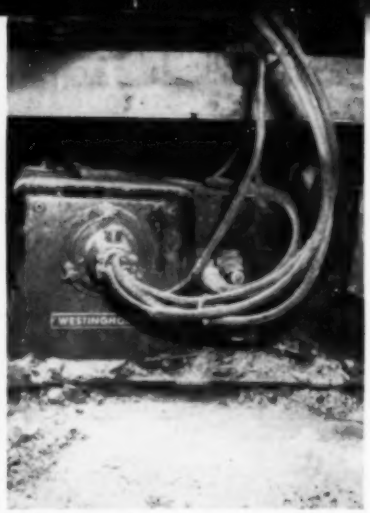
**THE INDUSTRY'S TREND toward modernization and mechanization of its larger mines shows up in this list of the 50 top producers prepared by J. R. Forsythe, general manager, *Keystone Coal Buyer's Manual*, a *Coal Age* affiliate. All but a few are equipped with cleaning plants, many of which were erected in the past few years. Of the country's 50 largest mines, 14 are new within the last 10 yr, 16 are captive mines and nine are strip operations. Part of the output of two anthracite mines on the list comes from stripping. Mr. Forsythe estimates that approximately 25% of the total coal production expected in 1952 will come from new mines opened in the past 5 yr.**

| COMPANY | NAME OF MINE | STATE | PRODUCTION 1951 | 1950 | 1945 |
|---|---|---|---|---|---|
| 1. U. S. Steel Co. (c) | Robena* | Pa. | 4,084,631 | 3,137,832 | 1,557,778[1] |
| 2. Peabody Coal Co. | No. 8 | Ill. | 2,538,457 | 2,343,258 | 1,916,322 |
| 3. Jones & Laughlin Steel Corp. (c) | Vesta No. 5 | Pa. | 2,258,899 | 1,804,556 | 1,243,827 |
| 4. Peabody Coal Co. | No. 7 | Ill. | 2,147,702 | 2,139,026 | 2,058,964 |
| 5. Hanna Coal Co. (s), Div. of Pitts. Consol. | Georgetown | Ohio | 2,085,572 | 2,247,989 | 1,942,055 |
| 6. Eastern Gas & Fuel Assoc. | Federal No. 1 | W.Va. | 2,047,672 | 1,613,916 | 1,692,509 |
| 7. U. S. Steel Co. (c) | Lynch | Ky. | 1,995,731 | 1,459,907 | 1,878,146 |
| 8. Jones & Laughlin Steel Corp. (c) | Vesta No. 4 | Pa. | 1,913,121 | 1,682,813 | 1,423,574 |
| 9. Semet Solvay Div. (c) | Harewood | W.Va. | 1,866,522 | 1,451,571 | 1,329,208[2] |
| 10. Clinchfield Coal Corp. (ps) | Moss* | Va. | 1,830,578 | 1,333,520 | New, 1947 |
| 11. Peabody Coal Co. | Peabody No. 17 | Ill. | 1,824,575 | 714,115 | New, 1949 |
| 12. Chicago, Wilmington & Franklin Co. | Orient No. 2 | Ill. | 1,746,918 | 1,936,762 | 2,991,939 |
| 13. Homestead Coal Co. (s) | Homestead* | Ky. | 1,661,238 | 1,699,003 | 456,337[2] |
| 14. United Electric Coal Cos. (s) | Fidelity No. 11 | Ill. | 1,601,693 | 1,859,788 | 1,545,552 |
| 15. Bethlehem Collieries Corp. (c) | Idamay No. 44* | W.Va. | 1,539,334 | 1,526,110 | New, 1946 |
| 16. U. S. Steel Co. (c) | Gary No. 2 | W.Va. | 1,533,197 | 1,352,970 | 1,711,444 |
| 17. Truax-Traer Coal Co. (ps) | Burning Star | Ill. | 1,518,143 | 1,029,408 | 1,332,965 |
| 18. Foley Bros. (c) (s) | Rosebud | Mont. | 1,488,300 | 1,710,000 | 2,555,207 |
| 19. Republic Steel Corp. (c) | Clyde | Pa. | 1,425,633 | 1,214,734 | 1,050,581 |
| 20. Consolidation Coal Co. (W. Va.), Div. Pitts. Consol. | No. 32 | W.Va. | 1,421,471 | 1,139,485 | 1,191,348 |
| 21. Pittsburgh Coal Co., Div. Pitts. Consol. | Mathies* | Pa. | 1,398,115 | 886,811 | 59,992 |
| 22. Inland Steel Co. (c) | Price* | Ky. | 1,367,438 | 1,233,251 | 1,430,000[3] |
| 23. Buckeye Coal Co. (c) | Nemacolin | Pa. | 1,366,965 | 1,372,935 | 2,102,678 |
| 24. Bethlehem Collieries Corp. (c) | No. 41 | W.Va. | 1,326,312 | 1,037,862 | 1,802,699 |
| 25. Old Ben Coal Corp. | No. 9* | Ill. | 1,308,562 | 1,342,113 | 162,006[4] |
| 26. Enos Coal Mining Co. (s) | Enos | Ind. | 1,305,313 | 1,224,190 | 1,314,831 |
| 27. Pocahontas Fuel Co., Inc. | Pocahontas 33 & 34 | Va. | 1,305,056 | 1,194,558 | 1,243,800 |
| 28. Tennessee Coal, Iron & Railroad Co. (c) | Concord* | Ala. | 1,284,126 | 740,696 | New, 1947 |
| 29. Guyan Eagle Coal Co. | Guyan 1, 3 & 4 | W.Va. | 1,277,711 | 1,092,682 | 838,055 |
| 30. Rochester & Pittsburgh Coal Co. | Lucerne | Pa. | 1,267,709 | 1,108,503 | 987,437 |
| 31. Enoco Collieries, Inc. | Enoco | Ind. | 1,257,853 | 1,137,467 | 915,223[6] |
| 32. Consumers Mining Co. (c) | Harman | Pa. | 1,235,862 | 1,228,702 | 1,053,860 |
| 33. United States Steel Co. (c) | Bridgeport | Pa. | 1,228,824 | 1,110,362 | 1,134,921 |
| 34. West Kentucky Coal Co. | Pleasant View* | Ky. | 1,218,686 | 1,036,994 | New, 1949 |
| 35. Hanna Coal Co. (s), Div. Pitts. Consol. | Bradford* | Ohio | 1,218,009 | 1,128,994 | 343,801[7] |
| 36. Rochester & Pittsburgh Coal Co. | Ernest | Pa. | 1,216,103 | 1,237,735 | 1,200,003 |
| 37. Lehigh Navigation Coal Co. (s) (ps) | Tamaqua | Pa. | 1,210,404 | 1,240,546 | 1,003,606 |
| 38. Ebensburg Coal Co. | No. 1 | Pa. | 1,198,704 | 1,036,809 | 1,167,343 |
| 39. Truax-Traer Coal Co. (s) | Red Ember | Ill. | 1,194,321 | 1,158,367 | 1,349,521 |
| 40. West Kentucky Coal Co. | East Diamond* | Ky. | 1,184,622 | 1,255,396 | New, 1945 |
| 41. Eastern Gas & Fuel Associates | Keystone | W.Va. | 1,157,173 | 925,700 | 1,218,086 |
| 42. Powellton Coal Co. | Jane Ann* | W.Va. | 1,147,183 | 1,030,379 | 610,000 |
| 43. Geneva Steel Co. | Horse Canyon* | Utah | 1,140,837 | 1,116,995 | 1,125,148 |
| 44. Northern Illinois Coal Corp. (s) | Wilmington No. 10 | Ill. | 1,138,199 | 1,106,416 | 1,483,583 |
| 45. Pittsburgh Coal Co., Div. Pitts. Consol. | Westland | Pa. | 1,122,544 | 880,948 | 813,613 |
| 46. Tennessee Coal, Iron & Railroad Co. (c) | Edgewater | Ala. | 1,117,055 | 1,075,220 | 916,064 |
| 47. Christopher Coal Co., Div. Pitts. Consol. | Arkwright No. 1 | W.Va. | 1,112,698 | 908,111 | 547,550[8] |
| 48. Christopher Coal Co., Div. Pitts. Consol. | Osage No. 3 | W.Va. | 1,109,013 | 877,807 | 996,949 |
| 49. United Electric Coal Cos. (s) | Buckheart No. 17 | Ill. | 1,108,943 | 1,132,415 | 712,044 |
| 50. Island Creek Coal Co. | No. 7 | W.Va. | 1,097,357 | 1,024,707 | 1,410,078 |
| TOTAL OUTPUT, 50 Mines | | | 75,151,084 | 66,280,434 | 55,820,647 |
| U. S. TOTAL, Anthracite, Bituminous and Lignite | | | 575,644,000 | 559,741,502 | 631,164,695 |

SYMBOLS: (a) Anthracite mines. (c) Captive mines. (s) Strip mines. (ps) Part of output from stripping. *New mines within the last 10 yr. [1] Ronco-Robena mine; Robena under development. [2] Deep mine, now exhausted. [3] Wheelwright mine, now part of Price. [4] Mine under development; opened in 1945. [5] 1944 tonnage; 1945 not available. [6] Knox Consolidated Coal Corp. [7] Bradford Collieries Corp. [8] Consolidation Coal Co.



**ON INTAKE AIR,** mine power center has dry-type transformers in inert nitrogen and 225-amp circuit breakers in explosionproof housings.



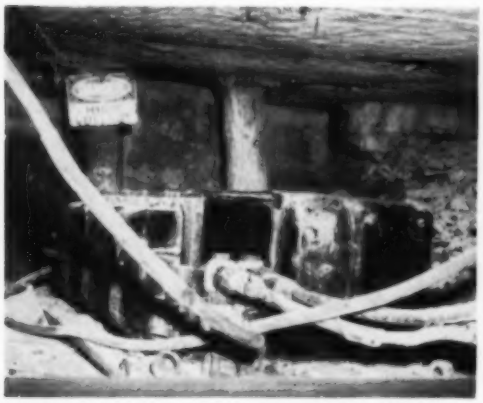
**HIGH-VOLTAGE END** of 150-kva power center receives 4,160 v from new feed cable.

# Power Centers Pare Labor 90%

**BEFORE complete revision of AC distribution system, moving a substation took 10 man-shifts and both voltage drop and safety were problems at Tioga No. 5.**

**NOW, with new 150-kva mine power centers and higher feed voltage, substations are moved 1,000 to 1,200 ft ahead in ½ to 1 man-shift, fire and shock hazards are eliminated and better voltage is provided at the face.**

THE MAN-HOURS INVOLVED in moving AC power centers in the Tioga No. 5 mine of the Tioga Coal Corp., Nicholas County, West Virginia, add up to less than one-tenth the average required when oil-filled transformers were used. The result has been that moves are made more often, better voltage is provided and less large-conductor low-voltage cable is used. The new mine power centers were installed in 1950 and, at the same time, the high-voltage feed into the mine was changed from 2,300 to 4,160 v.



**ON NEUTRAL AIR,** power centers are only 25½ in high. They have receptacles for six 240-v feeder cables.

**NEW POWER FEED,** a 3-conductor rubber-covered cable, hangs on a copper-clad messenger also acting as a ground.

This section of Tioga No. 5 was opened in 1947 by the Nicholas-Webster Coal Corp., which was taken over by the Tioga Coal Corp. in 1951. The operation is a 100% AC all-conveyor mine producing 1,000 tpd by hand-loading onto chain conveyors. The seam, called the Tioga, has 40 in of clean coal, topped by 16 in of drawslate which comes down or is taken down with the coal. Most of the drawslate is gobbed in the working places. In this area, the seam is practically level and outcrops on the hillsides, and thus is non-gassy.

## SECTION BELTS UP TO 2,000 FT.

Room conveyors deliver to section belts 1,800 to 2,000 ft long, which in turn discharge to a main belt line extending to the tipple storage bin. Cutting is done with Jeffrey 35BC shortwalls powered by 220-v AC motors. Coal drills and conveyors are powered with motors of the same voltage.

Twelve working units are used in advancing rooms on one side of a section and then mining on retreat on the other. Each consists of a cutting machine, 5-hp face conveyor, 10-hp room conveyor and a Chicago Pneumatic 572 coal drill.

In the original installation, using equipment moved from an earlier opening, power was taken in at 2,300 v and reduced to 240 v at substations consisting of three 50-kva oil-filled transformers. Safety precautions required that the substations be installed in masonry rooms on separate splits between intake and return airways. Transformer secondaries were delta-connected and there was no means of limiting voltage to ground or automatic tripping if a ground developed on the low-voltage system.

To move an oil-filled transformer substation ahead, it was first necessary to drain the oil so that the units could be tipped over on their sides for handling under low top. Usually, 10 man-shifts of labor was spent to build the new room and complete the move. Naturally, there was a tendency to put the moves off and extend the 240-v lines beyond economical limits.

COPPER-CLAD MESSENGER runs along conveyors as auxiliary ground.

## VOLTAGE DROP REMEDIED

As a thorough remedy for the voltage-drop difficulties and to make the whole job as safe as possible, it was decided to buy new entrance cable rated at 5,000 v and raise the feed voltage from 2,300 to 4,160, purchase fire- and explosionproof mine power centers with ground protection and procure new 240-v distribution cables in 100-ft lengths equipped with safety connectors.

Westinghouse 150-kva Type AVR mine power centers were selected and four of them have been installed in the mine. They have dry-type transformers with high-temperature insulation operating in an inert atmosphere of nitrogen in a heavy-duty case hermetically sealed. This type of mine-power center, or portable underground substation, can be moved 1,000 to 1,200 ft with ½ to 1 man-shift of labor. Since the units are fire- and explosionproof, they need no masonry rooms and can be set on the intake, return or neutral airways, as convenient.

The power centers are mounted on skid bases and have an over-all height of only 25½ in. Weight of the core and coils is 1,400 lb, and total weight of the unit is 2,600 lb, complete with attached air circuit breakers in an explosionproof housing together with polarized plug and receptacle potheads. Transformers are connected Y-Y, and ground wires are carried from the neutral point to all equipment units. Transformer windings have taps with leads brought out for reconnecting to boost voltage approximately 5%, as, for example, from 230 to approximately 240.

## BREAKER PROTECTION INCLUDED

There are three 225-amp (continuous-rating) circuit breakers on each power center equipped with magnetic trips that are closed manually. Relays are included to trip the breakers if the current in the ground conductor reaches 5 amp.

Each 240-v breaker feeds two polarized 4-pole receptacles, and thus six secondary cables can be connected to the power center. If an attempt is made to pull a plug while the power is on, an auxiliary contact is first broken, causing opening of the feeder breaker to prevent arcing.

With the transformer output at 230 v, the voltage from any conductor to ground is limited to 138 v. Secondary cables are Anaconda 4-conductor No. 2, rubber-covered, and 48 100-ft sections, fitted with Joy receptacles and plugs, were purchased. Some Ensign lever-type plugs and receptacles were purchased recently.

When advancing or retreating a panel, it is the practice to move the power centers every 500 to 600 ft. Two power centers take care of 12 working units, and each center is advanced around the one ahead when moves are made.

To take the 4,160-v power underground, 4,000 ft of Simplex Anhydrex 3-conductor 5,000-v No. 2 rubber-covered cable was purchased. It is hung in the intake airway on Copperweld stranded messenger wire serving as a ground conductor to trip an outside circuit breaker in case of a ground fault.

Frames of all belt conveyors are connected to ground by a stranded Copperweld messenger carried along the side of the pans and connected every 32 ft.

## POWER COST PER TON IS LOW

As would be expected with a 100% AC conveyor mine, the electrical energy consumed per ton produced is relatively small, which, of course, means a low power cost. During months of normal production of 14,000 to 15,000 tons, the total power consumption was between 4 and 5 kw-hr per ton, including the tipple, Airdox plant and outside buildings. There are no houses at the property.

In addition to the advantages of low-cost moves and better voltage at the machines, the new mine power centers with sectionalized and circuit breaker-protected secondary cables have eliminated fire and shock hazards. The portability and sturdiness of the power centers appeals to the mine management.

Recently, this area of Tioga No. 5 has been put on retreat operation. Upon complete withdrawal in a year or so, it is planned to develop another area of the property and reinstall the conveyors and AC equipment there.

Stanley M. Deal, now mine superintendent, is the authority for the comparative figures of ½ to 1 man-shift for moving the new Westinghouse power centers, as against 10 man-shifts for moving the old type. He was foreman of the mine before his recent advance to superintendent. Thomas T. Rees is president of Tioga Coal Corp., and Harold B. Davies is vice president. E. C. Barber is superintendent of Tioga No. 1 mine.

THIS TIGHT, TIDY FINE-COAL PLANT recovers about 850 tpd from a basin which formerly served as a settling site for water from nearby breakers.

**STAND-OUT FEATURES:**

1. **Closed water circuit**
2. **Controlled pH factor**
3. **Froth flotation**
4. **Effective launders**
5. **Feed and refuse pumping**
6. **"Chip-picking" hydrotator**

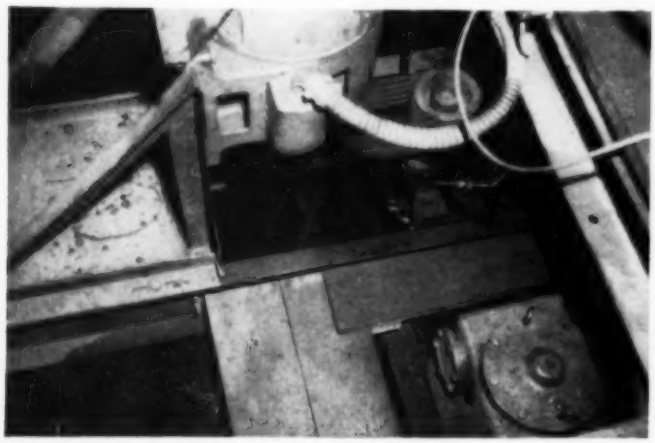
# Beaver Meadows Fine-Coal Plant

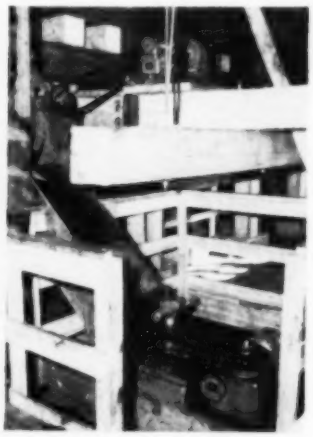
"WE HAD THE COAL and we had the customers, but we needed a tight, tidy plant to bring coal and customers together, economically. What you see is Wilmot Engineering Co.'s answer to our problem," says Jack Connell, president, John G. Connell Coal Co., Beaver Meadows, Pa., in relating the WHY and WHENCE of his silvery fine-coal plant.

The new plant, which has a rated feed capacity of 1,250 tons per shift and produces in single-shift operation 850 tpd, clean coal, incorporates a number of ideas for better fine-coal cleaning. Working an old silt basin which formerly served as a settling site for breaker water from nearby plants, the new facility recovers buckwheat, rice, barley, No. 4 and No. 5 coal. The values are in the minus ¾-in fines, coarser material being almost 100% refuse.

The Wilmot philosophy concerning the best way to recover the fines under prevailing conditions is exhibited in six major features as follows:

**1 A closed water circuit** practically eliminates any drain on local water

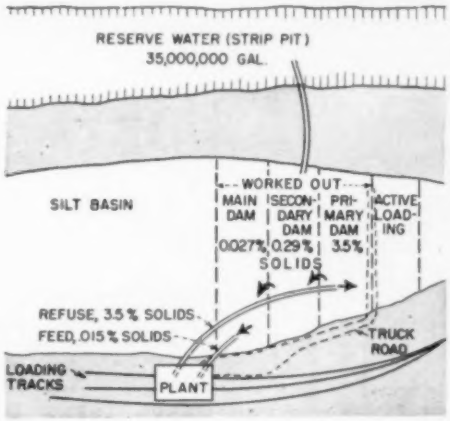




CLEANING UNITS are a 12-ft froth-flotation classifier (left) and three hydrotators like the buck-and-rice machine (right). All machines are equipped with positive drives and automatic controls for governing operating characteristics.

## Beaver Meadows Water Circuit

| Location | pH of Water | Percent Solids |
|---|---|---|
| (1) Water at fresh-water pump suction (Main Dam)—1,000,000 Gal. Capacity | 5.8 | .015 |
| (2) Water and material (2,800 gpm) from feed sludge pump at discharge to primary riffle | 5.6 | 17.2 |
| (3) Water at main-sizing-shaker sprays | 5.8 | .012 |
| (4) Return water at bull shaker | 5.4 | 1.6 |
| (5) Water and waste material to refuse sump. Lime is added to water in refuse tank before water enters refuse pump for discharge to primary dam | 5.4 | 3.5 |
| (6) Refuse pump discharge into primary dam | 6.0 | 3.5 |
| (7) Flow of water from other sources into primary dam | 5.3 | 1.75 |
| (8) Primary overflow into secondary dam | 5.9 | 0.29 |
| (9) Secondary overflow into main dam | 5.8 | 0.027 |
| (10) Reserve dam on top of mountain (35,000,000 Gal.) used for makeup when needed | 5.2 | NIL |



**THIS 75-HP VERTICAL PUMP** lifts feed from the sump below ground level to the primary riffle at the top of the plant. Makeup water is taken from ponds in the silt basin (right). Dragline loads into trucks which haul the raw silt to the plant.

supply and makes the plant independent of seasonal dry spells. Basic features of the system are settling dams in worked-out sections of the basin which receive refuse-carrying water for clarification and provide makeup water as needed for the cleaning units. Three of these dams are maintained in the circuit, providing primary and secondary settling ponds and a main reservoir. Makeup water comes from the 1,000,000-gal main supply reservoir which receives the clarified overflow of the secondary pond.

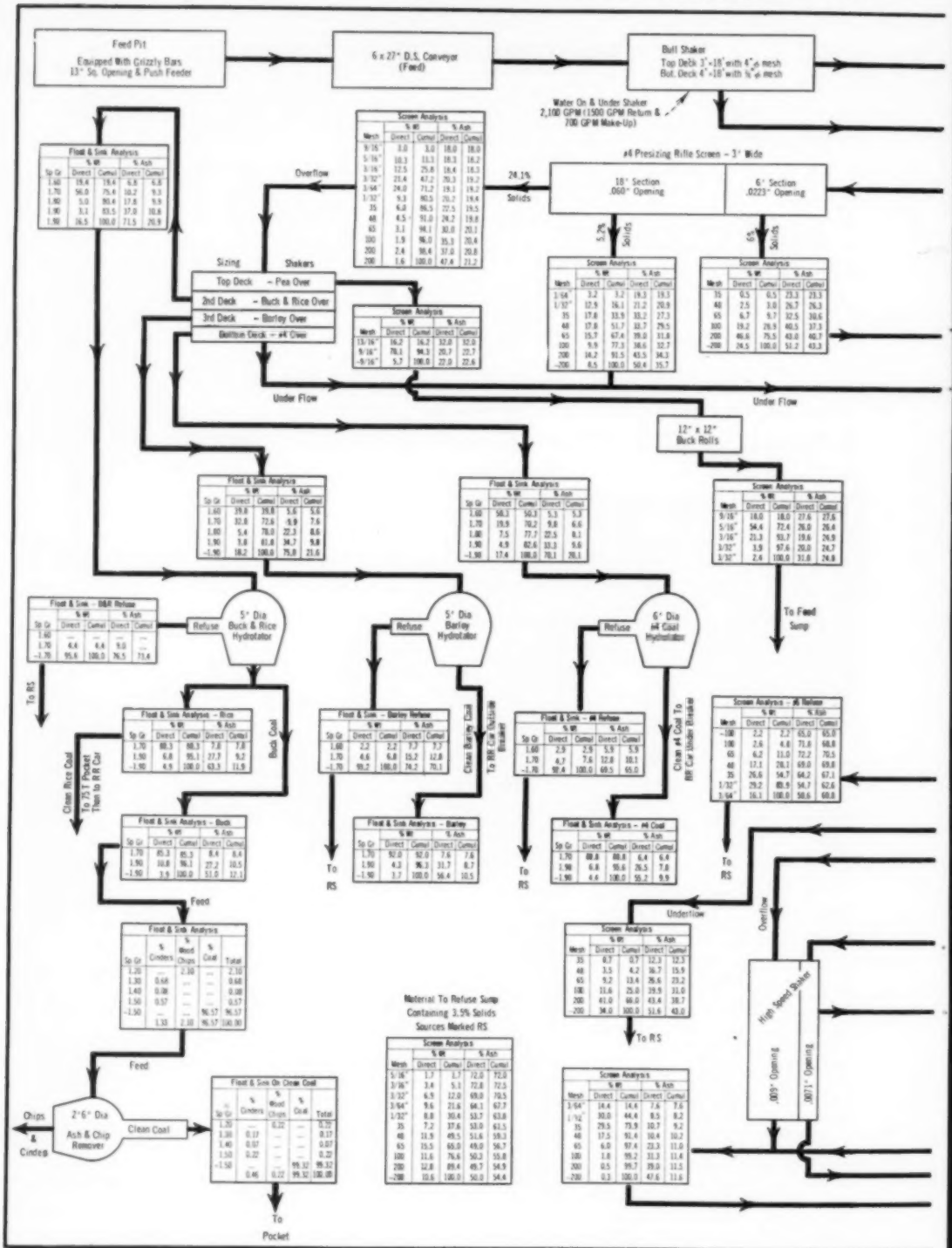
The supply of water in the secondary dam is bulwarked by a reserve of 35,000,000 gal in a reservoir in a nearby mountainside strip pit. Furthermore, in an effort to plug all possible leaks, the designers specified a graded paved surface under the plant so that even railroad car drainage is collected and returned to the feed sump.

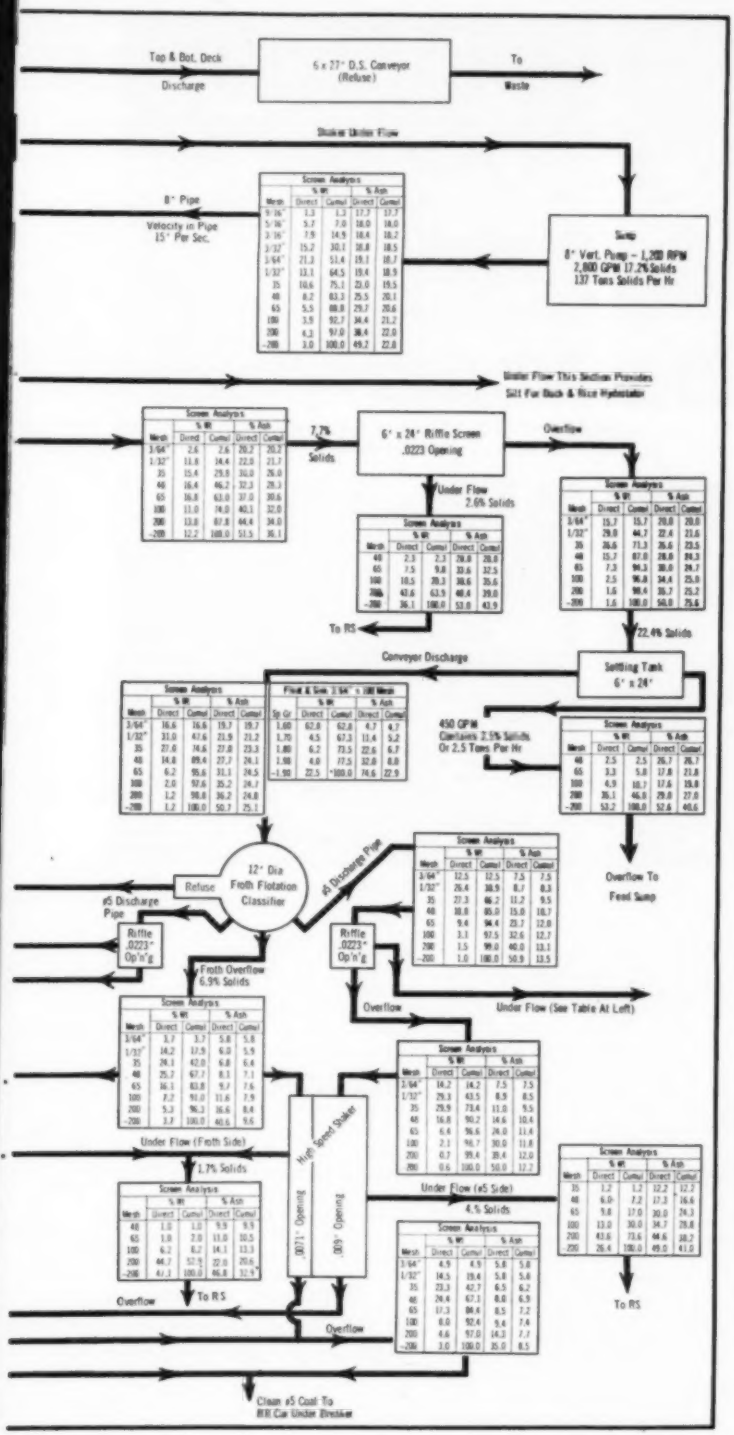
**2** **Controlling the pH** of the process water provides benefits for both the producer and consumer of Beaver Meadows coal. Clean, neutral water permits the company to achieve a sharper separation and minimizes equipment corrosion. The consumer receives a product that has no clinging layer of hard-to-burn fines around the coal particles, thus an easier-to-unload, better-burning fuel.

The plant is equipped with feed and refuse sumps, and for pH control 200 lb of lime per shift is fed into the refuse sump by a Savage chemical feeder. The refuse- and lime-bearing water then is pumped to the primary settling dam where the time of retention before recirculation assures adequate neutralization. As an added benefit, the lime assists in flocculating and settling the fine solids in the reject water. As shown in the illustration, the clarified water, as picked up by the feed pump, contains only 0.015% solids, while exit water contains 3.5% solids.

**3** **Froth flotation** in a 12-ft Wilmot froth-flotation classifier recovers fine coal in the ⅜ax0 size range, but the size-consist of the final product, No. 5, is adjusted to standard specifications by a parallel pair of Weco vibrating screens which remove water and mi-

## Beaver Meadows flow-and-data diagram illustrates new cleaning ideas . . .






nus 100-mesh high-ash fines from the flotation coal.

**4 Effective launder screens,** or riffles, among the earliest coal-cleaning devices to be developed, now assist modern cleaners in most Wilmot-designed plants to do a faster, better cleaning job by presizing and preconditioning the feed for the cleaning units. And in one instance at Beaver Meadows, the product of a cleaning unit, coarse coal from a submerged draw in the flotation machine, is riffle-treated to provide a final boost in quality.

The first riffle in the circuit is a 3x24-ft unit ahead of the main sizing shakers which presizes the shaker feed to remove excess fines (minus ¾4 material which is bypassed to second riffle) that would complicate the sizing process. The second riffle, 6x24 ft, drops another portion of high-ash fines (minus 100-mesh) out of the circuit ahead of the settling tank from which feed for the flotation machine is taken. The second riffle is fed from the combined underflow of the main shakers and a portion of the underflow of the first riffle. The final riffles receive the coarser flotation product which is discharged from submerged collecting pipes in the flotation unit. These final riffles remove fines, water and reagents before discharging the coarse product onto the dewatering screens. So at three places in the circuit, riffles are provided to (1) remove high-ash fines to prevent burdening the cleaners with such fines, (2) adjust the solids-liquid ratio of the stream as it courses through the plant, and (3) further refine clean coal from the froth-flotation unit.

**5 Pumping both feed and refuse** is a most effective method for controlling the cleaning process in a plant of this type, according to the designers. Material from the feed sump is pumped to the presizing riffle, the pump impeller breaking up "liver" to free all values in the feed and expose them to the cleaning action in the various machines. (For readers west of the Susquehanna, liver is the more or less solid globs of fine coal and clay which might not be sufficiently broken up for single-particle cleaning in a gravity-fed plant.)

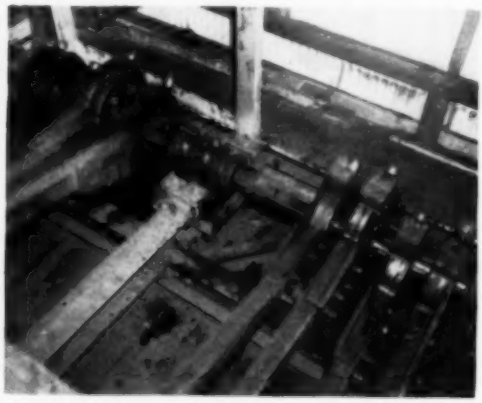
Refuse from all units is piped to the refuse sump at ground level and is pumped from there, treated with lime, to the primary settling dam. The feed pump is a vertical 8-in unit and the refuse pump is a 6-in centrifugal, both Barrett-Haentjens.

**6 The chip-picker** is a 2½-ft Hydrotator operating at a gravity of 1.45 to remove cinders and wood chips which

## Mechanical refinements raise efficiency in fine-coal cleaning . . .

**PRIMARY RIFFLE** (left) removes excess water and high-ash fines ahead of main shakers, and provides process silt for buck-and-rice machine. Secondary riffle (right) has stepped screen surface for better screening of flotation feed.

**CHIP PICKER** is a 2½-ft unit operating at 1.45 gravity. Note clean coal leaving "refuse" conveyor.



**FOUR DECKS** on sizing shaker are cammed 90 deg apart for smoother action and less plant vibration.

**DOUBLE-DECK DEWATERING SCREENS** separate buck and rice. Chips and cinders come over top deck with buckwheat.

by virtue of their size are concentrated in the buckwheat coal. In effect, the chip-picker operates in reverse, since the coal sinks and is removed from the unit by the "refuse" conveyor. While the cinders and chips are not present in sufficient quantity to materially affect the ash content of the clean buck, they had an adverse effect upon its appearance.

### CLEANING THE COAL

Upon completing exhaustive preliminary tests of the feed, it was decided to build the plant alongside the silt basin and about equidistant from its ends. Methods studies established that it would be advantageous to work 150-ft-wide sections of the basin toward the upstream end first, then conclude the job in the future by working similar sections from the plant toward the downstream end.

A dragline at the currently active section loads trucks which carry the material to the plant. A platform for the dragline and haulage roads for the trucks are constructed of stable materials such as rock and gravel from nearby spoil piles. The road fills, crossing the basin, later serve as dikes to separate the settling dams into which plant refuse is dumped, but eventually they will be reclaimed in their entirety.

The trucks dump through a grizzly having 13-in square openings (see accompanying flow-and-data diagram). From the grizzly, the feed drops into the feed hopper from where a push feeder pushes feed into the conveyor line which supplies the double-deck bull shaker. The 3x18-ft top deck has 3-in round holes, the 4x18-ft bottom deck ¾-in round holes, and the refuse overproduct of both decks is carried by a conveyor to a pocket for truck disposal. Water sprays above the

**RAILROAD CARS** are loaded with Nos. 4 and 5 inside the heated plant. Car drainage returns to feed sump.
**OPERATOR AND DESIGNERS**—Arthur Keiper (left), construction foreman, and C. S. Jenkins, chief engineer, Wilmot Eng. Co.; J. G. Connell, president, John G. Connell Coal Co.; G. L. Wilmot, president, and C. L. Kovatch, field engineer, Wilmot.

bull shaker wash fine material from the oversize to prevent loss of fine coal.

The underflow of the bull shaker (minus ¾ in) drops into the feed sump where it is pumped to the presizing riffle at the top of the plant. The 3x24-ft riffle consists of a 6-ft-long section with 0.0223-in openings and an 18-ft-long section with 0.060-in openings. Underflow from the 6-ft section provides silt for the buck-and-rice Hydrotator, while underflow from the 18-ft section combines with the underflow of the main sizing shakers to provide feed for the froth-flotation circuit.

Overproduct of the presizing riffle discharges directly to the 4-deck main shaker. The overproduct of the top deck is reduced to minus 5/16 in in a set of 12x12-in rolls and returned to the feed sump for recirculation. This steps up the yield in finer sizes by breaking them out of high-gravity pea-size feed. The overproduct of the second deck is feed for the 5-ft buck-and-rice-cleaner.

Material passing over the third deck is raw barley for another 5-ft Hydrotator and the overproduct of the bottom deck is fed to a 6-ft Hydrotator which cleans No. 4 coal. The underflow of the sizing shaker joins the underflow of the 18-ft section of the presizing riffle, as mentioned.

The combined stream then is directed to a 6x24-ft preconditioning riffle, 0.0223-in openings, which removes another increment of high-ash fines from the stream. The underflow containing these fines is piped to the refuse sump and the overflow is directed to a settling tank (6x24 ft) which conditions flotation feed.

The settling-tank conveyor discharges dewatered fines to the flotation-unit feed chute, while the tank overflow containing some recoverable fines is returned to the feed sump.

The 12-ft Wilmot froth-flotation classifier for cleaning No. 5 coal uses Hercules Yarmor pine oil and fuel oil as reagents. Two clean-coal draws are provided, one as froth and the other through submerged collecting pipes which gather coarse particles that do not rise with the froth. The coarse product is split and passed over another pair of riffles, the final ones in the circuit, to remove excess water and another increment of high-ash fines. Froth and coarse coal from the collecting pipes are dewatered on separate sections of two Weco high-speed shakers, the froth passing over cloth with 0.0071-in openings and the coarse product over cloth with 0.009-in openings. The shakers remove most of the water, oil and minus 100-mesh fines, all of which are piped to the refuse sump, and the overproduct is chuted to the No. 5 coal pocket.

## THE NEW AND NOVEL

In addition to the cleaning concepts described earlier in this article, the Beaver Meadows plant includes efficiency-raising mechanical features such as step-down sections in the 6x24-ft preconditioning riffle, 90-deg camming on the driveshaft of the main shaker and enclosed ducts for carrying feed, refuse and recirculating loads through the plant.

The screen surface in the preconditioning riffle consists of four 6-ft-long sections with 3½-in drops between sections. The drops permit more effective screening by turning over the material as it proceeds through the riffle so that all particles in the stream are exposed to the screen surface. Furthermore, the gradient of each section is greater than the gradient of the preceding section to maintain the velocity of the stream as water is drawn off through the riffle. Better screening and no blinding of the screen surface are the major advantages offered by this design.

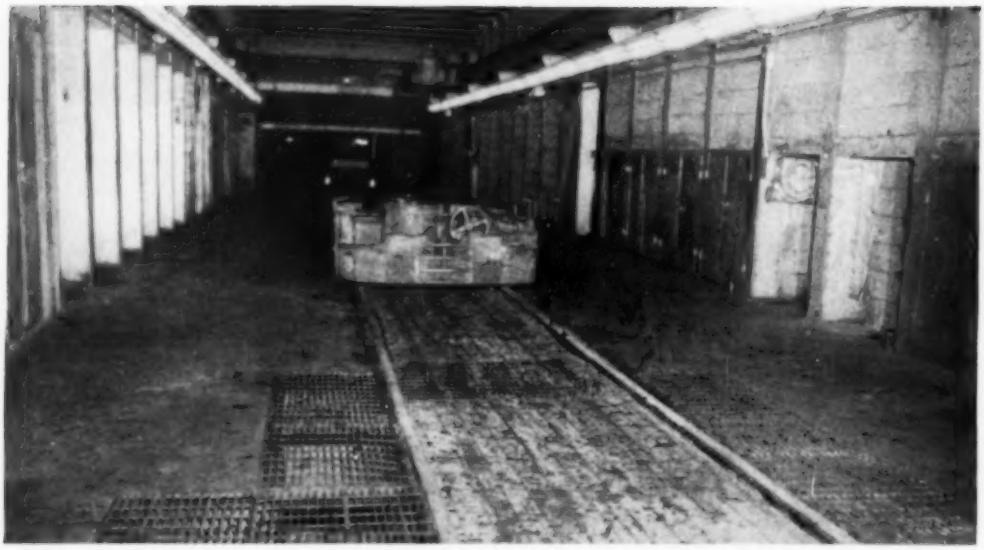
In many multiple-deck sizing-screen installations, cams on the drive-shaft are 120 deg apart, rotationally. At Beaver Meadows, however, the 4-deck unit is driven from a single shaft having cams 90 deg apart. Faster, smoother screening with less vibration in the structure are the major advantages.

Excess water from all Hydrotator sumps (under the dewatering screens) and from the settling tank is returned to the feed sump through steel 6-in pipelines. Hydrotator refuse, flotation-unit refuse and the underflow of the Weco screens which dewater flotation coal is washed into the refuse sump through similar pipe lines. A cleaner plant and strict water economy are the advantages.

In cold weather some of the feed freezes, and frozen lumps which are too large to be handled are pushed from the grizzly surface to a storage pile by a bulldozer. In warmer weather the thawed lumps will be returned to the feed hopper by the 'dozer.

The plant is operated on a 1-shift basis by nine men including the foreman. In supervising operations, Mr. Connell is assisted by Michael Markovchik, superintendent. Two men operate all cleaning machinery in the plant, and the other men are employed as car-runners and in other duties at the feed end of the operation.

Up to now, the best shift recorded in the 480-hp plant is 930 tons of clean coal.



**AT NEW COALWOOD SHOP** 600 ft underground, pit and rows of fluorescent fixtures extend the full length of the main room. Floor gratings in the left foreground cover pit side spaces providing ready access to locomotive journals.

## Importance of Machine Maintenance Key to Design of . . .

# New Shop 600-Ft Underground

**Eliminating all short-comings of old shop, new facility at million-ton Olga No. 1 mine has a 92-ft-long repair pit, fluorescent lighting and separate rooms for workshop, supplies and machine cleaning. Test lamps on cranes speed up grounding checks.**

EVERY MODERN FACILITY for economical maintenance of its underground equipment in No. 1 mine, Coalwood, W. Va., is incorporated in a new underground shop recently completed by the Olga Coal Co. The old shop, which was hardly more than a motor barn, had served the 40 yr since the mine was opened and was entirely inadequate for modern mining. Olga Coal Co., organized only a few years ago and owned by the Youngstown Sheet & Tube Co. and Interlake Iron Corp. & Steel Co., acquired the mine from the Carter Coal Co. in 1947. No. 1 mine now is producing around 1,000,000 tons per year.

The hoisting shaft is 584 ft deep and since the mine is very gassy and is operated with permissible equipment, including battery locomotives on the mainline, the new shop was placed near the shaft bottom (600 ft) and not far from the old shop.

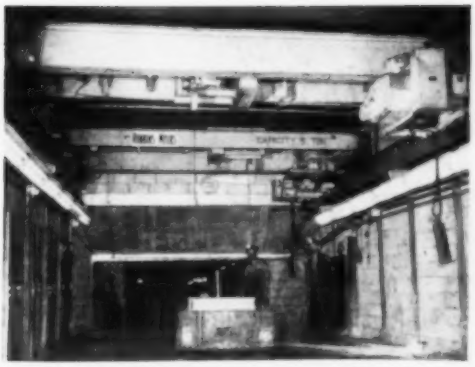
Plenty of floor space, a pit large enough for four or five machines, high-intensity lighting in the main room and good lighting in the pit, storage space for supplies, lockers for tools, adequate facilities for cleaning equipment, and pleasant conditions for workmen, were some of the goals achieved by the company in design of the new shop.

The main room measures 18x103 ft and has a steel ceiling supported by steel beams. Two Robbins & Myers 5-ton bridge cranes with an 18-ft span serve this room and have reversing push-button pendant controls of the hoist, trolley and bridge. Test lamps with test leads on spring rewind reels have been added to the cranes. The test terminal hangs over the center of the pit just within reach of the workmen. The lamp on the crane lights when the bare tip of the test lead is touched to the rail or a grounded conductor. This arrangement, alone, saves a lot of time in testing for grounds and continuity of conductors and contacts.

In a straight line with and adjoining the main room is a 10x100-ft clean-up room with a 7-ft ceiling. Opening off one side 22 ft from the far end is a 10x10-ft room where an electrically-heated Steam Jenny is located. On the other side is a 16x32-ft wing, the main part of which serves as a supply room for locomotives. At the inby end of this wing is a toilet room with urinal and flush toilet.

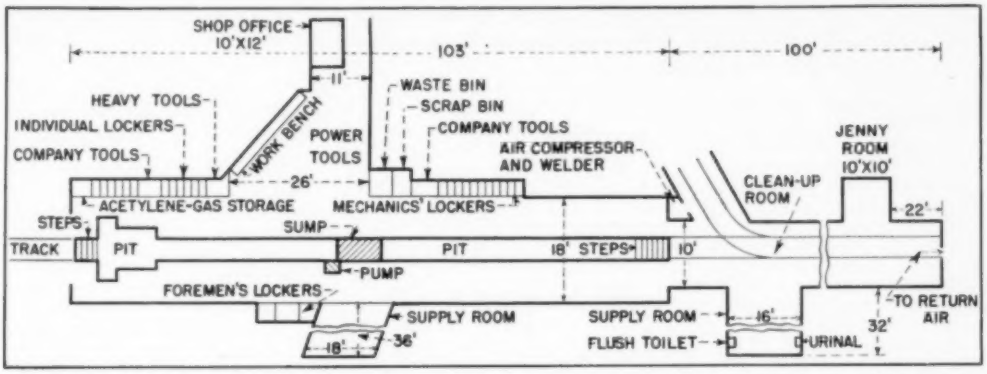
To reduce noise in the shop, the air compressor (Ingersoll-Rand) and the arc-welding machine (a Lincoln 400-amp unit) are installed in a separate room at one end of the shop with its door back around a corner. Welding receptacles and air connections are installed along one wall of the main room.

Illumination is supplied by an end-to-end row of double-tube fluorescent fixtures under the crane rail on each



**TWO 5-TON BRIDGE CRANES** operating under a 14-ft ceiling serve the full 103-ft length of the shop's main room. They have reversing push-button pendant controls.

**TRIANGULAR-SHAPED WORK ROOM** on side has a long work bench with two heavy vises and several essential power tools.

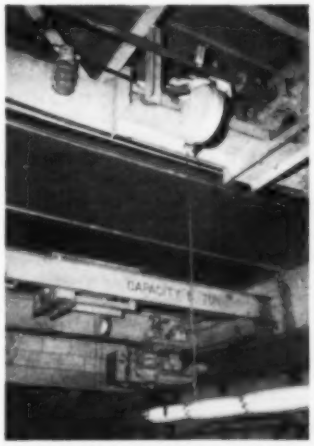



**SHOP FACILITIES,** carefully planned to achieve goals, match maintenance needs in advanced mechanical mining.

side of the room. They provide 26 ft-c intensity at floor level and 30 ft-c at machine level 30 in above the floor. Pit illumination also is supplied by fluorescent fixtures, which are recessed in the walls.

The pit is 92 ft long and its entire opening is covered with removable sections of steel grating. One end of the pit, which is made wider for working on locomotives, has extra-wide sections or wings to permit ready access to journal boxes.

Supply parts for loading and cutting machines are kept in steel bins in an 18x36-ft supply room at the center and off to one side of the main room. Opposite it is another side room that serves as the workshop. The opening to this room, obstructed only by steel columns supporting the crane rail and roof, is 26 ft wide. The room tapers back to an 11-ft width, where there is the 10x12-ft shop foreman's office equipped with electric heat. The work room has a long work bench with heavy vises at each end. Other



**TEST LAMP** mounted on top of each crane, with a test lead hanging down from a spring rewind reel, saves considerable time in testing for grounds and conductor continuity.

work-room equipment consists of an emery wheel, power hack saw, 60-ton hydraulic press, drill press, brake-lining machine and washing machine for small parts.

Mechanics do not keep tool chests in the shop. Instead, each man is assigned a steel locker, which provides more space and is a much handier place for his tools. Lockers are 17x32x 48 in and are set back flush with the wall. There are 22 lockers of this size.

Two large wall cabinets, for which the three inside maintenance foremen have keys, house the company tools.

Machine-tool jobs, assembly overhauls and so forth, are handled in an outside central shop at Coalwood near the administrative office. H. E. Mauck is general superintendent of the company, W. A. Laird, mine superintendent, and Emil J. Servant, electrical and mechanical engineer.

At No. 1 mine, A. L. Lindley is the master mechanic and is, by the way, rightly proud of his new shop and the facilities it offers.

# How to Predict Results Of Washing a New Coal

**Here, explained by an expert, in everyday working terms, is a simple useful way you can readily forecast recovery percentage and final ash content either in designing a new washery or planning treatment of a different coal in an existing plant.**

By M. R. GEER, Mining Engineer,
U. S. Bureau of Mines, Region II, Seattle, Wash.

WHAT PERCENTAGE OF THE RAW COAL will be recovered in the washed product, and what will be the ash content of the washed coal? The answers to these two all-important questions must be provided by the coal-preparation engineer when he forecasts the results of a new washing operation, either in connection with the design of a new washery or in planning the treatment of a new coal in an existing plant.

Fortunately, relatively simple engineering calculations can take the guesswork out of predicting washery performance if the necessary basic data are available. The information required is complete performance data on the washing unit involved and a float-and-sink test on the new coal. Often this information is already available but, when not, it can be obtained at a cost that is modest in comparison with the cost of an overly-optimistic guess on the results of the new washing operation.

For years, preparation men in both America and Europe have employed a type of plot called a "distribution curve" to show the performance of a washing unit. Use of this curve to predict results of a washing operation is a relatively new technique in this country, however. The distribution curve is simply a plot showing what percentage of each density fraction of the raw coal was recovered in the washed product and what percentage was rejected as refuse. This information is provided by float-and-sink tests of the washed coal and refuse.

Each type of washing equipment has its own characteristic distribution curve, and this curve is substantially

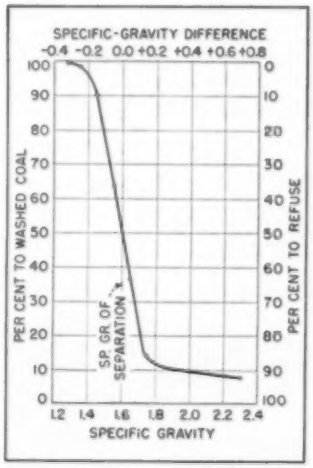

SPECIFIC-GRAVITY DIFFERENCE
-0.4 -0.2 0.0 +0.2 +0.4 +0.6 +0.8
PER CENT TO WASHED COAL
PER CENT TO REFUSE
SP GR OF SEPARATION
SPECIFIC GRAVITY
1.2 1.4 1.6 1.8 2.0 2.2 2.4

**FIG. 1.—DISTRIBUTION CURVE** for a 2-compartment 5-cell jig based on data listed in Table I. It is used in figuring results for a new coal (Table II).

independent of the density composition of the coal being washed. On this point rests the usefulness of the curve in predicting washing results. The following example will illustrate the calculations involved for a 2-compartment 5-cell Baum-type jig treating a 3-in slack in the state of Washington.

In Table I, Columns 2, 4, 5 and 7 give the results of float-and-sink tests on washed coal and refuse produced by the jig. Columns 3 and 6 show these weights as percentages of the raw coal. Adding Columns 3 and 6 provides the specific-gravity analysis of the composite feed to the jig shown in Column 8. Then, dividing the weights in Column 3 by those in Column 8 shows what percentage of each density fraction was recovered in the washed coal. Consider, for example, the fraction lighter than 1.30 sp gr. Of the 46.5% of this material present in the raw coal, 46.3% was recovered in the washed product; thus 46.3/46.5 x 100, or 99.6%, entered the washed coal. Similarly, the raw coal contained 6.4% of impurity heavier than 1.80 sp gr, and 0.5, or 7.8%, of this material entered the washed coal.

The percentage recoveries, shown in Column 10, are called "distribution factors" because they show how each density fraction of the raw coal was distributed between the two washery products. When plotted against the average density of the individual float-and-sink fractions they form the distribution curve shown in Fig. 1. The curve crosses the 50% ordinate at 1.60 sp gr, indicating that material of this density was divided equally between washed coal and refuse. By definition, this is the specific gravity of separation.

In Table I, Column 11 shows the interval or difference between the specific gravity of separation and the average specific gravity of each fraction of the coal. These specific-gravity differences, with the corresponding distribution factors, constitute the information needed for predicting the results of washing another coal in the same unit. Their use for this purpose is based on the premise that, in a given washing unit, the proportion of any density fraction of the raw coal

recovered in the washed product is determined solely by the difference between the average density of that fraction and the density of the separation.

In other words, the data in Table I show that with the jig operating on Coal A and making a separation at 1.60 sp gr, 63.6% of the 1.50- to 1.60-sp gr fraction was recovered in the washed coal. Therefore, if the jig were used to treat a new coal at a specific gravity of separation of 1.70, 63.6% of the 1.60 to 1.70 fraction would be recovered in the washed product. Since in both cases the difference between the specific gravity of the separation and the average specific gravity of the fraction is the same, the distribution factor also remains the same. Stated still differently, with this jig a distribution factor of 63.6% is applicable to material having a specific-gravity difference of −0.05, regardless of whether the specific gravity of separation is 1.60 or 1.70.

The calculations involved in applying this principle are illustrated in Table II. The coal—designated as B—is from an underlying bed on the same property. With the reserves of Coal A approaching exhaustion, a study was made of Coal B to forecast the results of treating it in the existing preparation plant. The float-and-sink test of Coal B, shown in Columns 4 and 5 of Table II, indicated that in raw form it is dirtier than Coal A. Consequently, to preserve a yield of washed coal comparable to that obtained from A, the specific gravity of separation would have to be higher. A separation at 1.70 was selected for the projected operation.

Column 2 shows the specific-gravity differences for each fraction of the raw coal obtained by subtracting the average specific gravity of the fraction from 1.70. The corresponding distribution factors of Column 3 were read from the curve, with values for the two lowest-density fractions representing an extrapolation of the data. Multiplying the specific-gravity composition of Coal B (Column 4) by these distribution factors gives the density composition of the washed coal in percentages of the raw coal, as shown in Column 6.

The sum of Column 6, 89.2%, is the yield of washed coal to be expected from washing Coal B at 1.70 sp gr. It compares with a washed-coal yield of 90.7% obtained with Coal A and hence confirms the choice of 1.70 sp gr for the treatment of Coal B.

Using the yield of washed coal as a denominator converts the weights in Column 6, which are percentages of raw coal, to the percentages of washed coal shown in Column 7. To arrive at the corresponding figures for refuse, Column 6 is subtracted from Column 4, entered in Column 9, and divided by the total of this column.

The ash content of the washed coal and refuse is found by assuming that the ashes of their individual density fractions are the same as those of the corresponding fractions in the raw coal. This assumption is sufficiently accurate in virtually all cases, even though the heaviest fraction of a washed coal generally is lower in ash content than the corresponding figure for raw coal. Usually, there is so little heavy impurity in the washed coal that even a relatively large error in its assumed ash content has negligible influence on the ash of the total product.

The calculated ash content of the washed coal available by treating Coal B at 1.70 sp gr is 14.6%. It compares with an ash of 10.8% obtained in washing Coal A. However, the increase in ash content must be accepted if the yield of washed coal is to be held at about 90%.

This method of predicting the results of washing is superior to other methods of arriving at the same information. Actually, however, like most other engineering techniques, it should be applied with some discrimination. Its principal limitation lies in the effect of particle size. No washing device separates the finest portion of its feed as sharply as the coarser material, and generally the finer sizes are separated at a higher density. Hence, the size composition of the coal being washed influences the shape of the distribution curve somewhat. For this reason, the results of washing a 5-in slack, for example, should not be predicted from a distribution curve representing operation of the equipment in question on, say, a 6x2-in-sized feed. Size compositions must be comparable. Similarly, the performance of any washing unit is influenced by its mechanical condition, by the skill with which it is adjusted, and certainly by excessive throughput. These factors, too, should be comparable.

## TABLE I.—Performance Data and Calculations for Coal A

| | Specific-Gravity Analyses | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Washed Coal | | | Refuse | | | Feed | | | | |
| | Weight | | | Weight | | | | | | | |
| Specific Gravity | % of Washed Coal | % of Feed | Ash, % | % of Refuse | % of Feed | Ash, % | Weight, % | Ash, % | Distribution Factors, % | Specific Gravity Difference |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
| Under 1.30 | 51.1 | 46.3 | 6.5 | 2.2 | 0.2 | 6.1 | 46.5 | 6.5 | 99.6 | −0.32 |
| 1.30 to 1.40 | 41.3 | 37.5 | 12.6 | 6.4 | 0.6 | 14.4 | 38.1 | 12.6 | 98.4 | −0.25 |
| 1.40 to 1.50 | 5.0 | 4.5 | 24.3 | 5.4 | 0.5 | 21.1 | 5.0 | 24.0 | 90.0 | −0.15 |
| 1.50 to 1.60 | 1.5 | 1.4 | 33.2 | 8.6 | 0.8 | 35.9 | 2.2 | 34.2 | 63.6 | −0.05 |
| 1.60 to 1.70 | 0.4 | 0.4 | 41.9 | 7.5 | 0.7 | 43.8 | 1.1 | 43.1 | 36.4 | +0.05 |
| 1.70 to 1.80 | 0.1 | 0.1 | 52.4 | 6.5 | 0.6 | 53.6 | 0.7 | 53.4 | 14.3 | +0.15 |
| Over 1.80 | 0.6 | 0.5 | 64.6 | 63.4 | 5.9 | 76.6 | 6.4 | 75.7 | 7.8 | +0.70 |
| Total | 100.0 | 90.7 | 10.8 | 100.0 | 9.3 | 60.6 | 100.0 | 15.5 | .... | ..... |
| | Known | (2)x Yield | | Known | Known | (5)x (100-Yield) | Known | (2) + (6) | (3)x(4) + (6)x(7) / 8 | (3)/ (8) | From Curve |

## TABLE II.—Calculation of Results to Be Expected in Washing Coal B

| | | | Specific-Gravity Analysis of Feed | | Specific-Gravity Analysis of Washed Coal | | | Specific-Gravity Analysis of Refuse | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Weight | | | Weight | | |
| Specific Gravity | Specific Gravity Difference | Distribution Factor, % | Weight, % | Ash, % | % of Feed | % of Washed Coal | Ash, % | % of Feed | % of Refuse | Ash % |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
| Under 1.30 | −0.42 | 100.0 | 20.0 | 7.0 | 20.0 | 22.4 | 7.0 | 0.0 | 0.0 | 7.0 |
| 1.30 to 1.40 | −0.35 | 99.8 | 52.3 | 12.3 | 52.2 | 58.5 | 12.3 | .1 | .9 | 12.3 |
| 1.40 to 1.50 | −0.25 | 98.4 | 11.4 | 23.8 | 11.2 | 12.6 | 23.8 | .2 | 1.9 | 23.8 |
| 1.50 to 1.60 | −0.15 | 90.0 | 3.8 | 35.6 | 3.4 | 3.8 | 35.6 | .4 | 3.7 | 35.6 |
| 1.60 to 1.70 | −0.05 | 63.6 | 1.9 | 41.8 | 1.2 | 1.4 | 41.8 | .7 | 6.5 | 41.8 |
| 1.70 to 1.80 | +0.05 | 36.4 | 1.0 | 50.4 | .4 | .4 | 50.4 | .6 | 5.6 | 50.4 |
| Over 1.80 | +0.60 | 8.0 | 9.6 | 77.1 | .8 | .9 | 77.1 | 8.8 | 81.4 | 77.1 |
| Total | .... | .... | 100.0 | 20.6 | 89.2 | 100.0 | 14.6 | 10.8 | 100.0 | 70.5 |
| | From Curve | From Curve | Known | Known | (3)x (4) | 6/Yield | (5) | (4)− (6) | 9/(100-Yield) | (5) |

**POWERFUL BULLDOZERS** clear away trees, prepare areas for the pans, open crop lines and build truck roads.

**HEAPED PAN** holds 18 to 19 yd and is pulled by tractor delivering 148 maximum drawbar horsepower.

# Larger Equipment Moves Cover Economically

**HIGH POINT** is knocked off by a bulldozer. In future, an auger will be used, with less deep-cover stripping.

**VERTICAL DRILL,** which displaced a horizontal unit, drills after pans and bulldozers have taken top soil and sand.

**NEW LOADING SHOVEL** (foreground), and new strip shovel. A bulldozer levels the material cast by the strip shovel and moves boulders too large for it. R-O-M is loaded for direct trucking to chemical-plant customer (right).

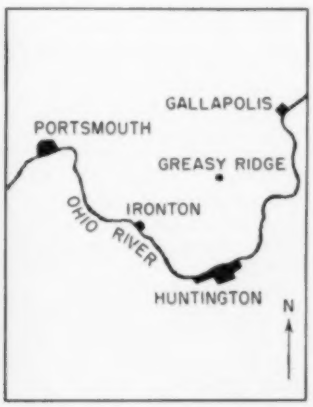
**THREE TRACTORS** pulling 18-yd pans strip the top of a knoll at the Greasy Ridge mine. Traveling a figure-eight, they carry dirt both ways, with each unit handling 360 yd an hour, and taking about 90% of the overburden.

# Tractors and Pans Cut Cover

**Greasy Ridge stripping, mining the Pittsburgh No. 8 seam in the southern tip of Ohio, replaces all equipment with new larger units, adding augers for thick cover. Tractors and pans skin off top, with shovel and bulldozers completing overburden removal.**

OHIO'S SOUTHERNMOST MINE in the 100,000- to 200,000-ton-per-year class is a comparatively new strip operation mining the Pittsburgh No. 8 seam in Lawrence County, Mason Township, approximately 14 mi airline from each of the following Ohio River cities, Ironton and Gallipolis, Ohio, and Huntington, W. Va. In

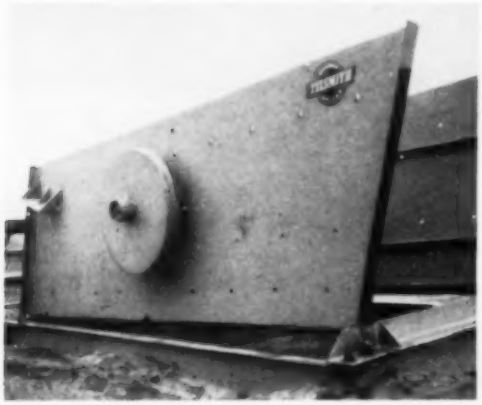
**NEW AUGER UNIT** was recently purchased to recover coal from small areas of deep cover. Future stripping limit has been set at 45 to 50 ft.



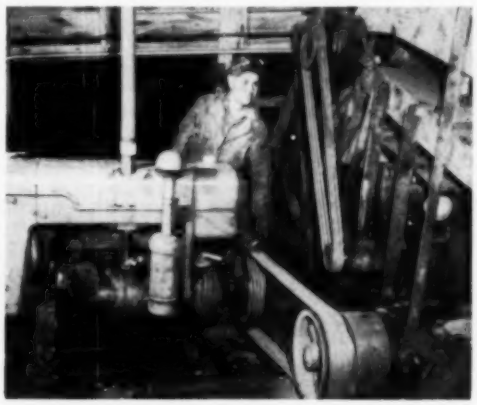

**MINE** is about an equal distance from Ironton, Gallipolis and Huntington.

**GREASY RIDGE TIPPLE** can prepare five sizes for domestic and commercial use. Only about 35% of the 1951 output was put through the tipple.

**PITTSBURGH NO. 8 COAL,** is loaded without shooting with ¾-yd bucket.



**NEW VIBRATOR** purchased to displace the shaker screen is one of the recent improvements in the tipple.



**TWO NEW GASOLINE ENGINES** like this are recent replacements powering tipple machinery.

1950-51, the mine, which was opened in 1945 with small machinery, was completely refitted with new larger-size equipment of the latest design. The mine is operated by the Greasy Ridge Coal Co., which is owned by Lindsey Belville and his sons, Bob and Tommy, of Ironton. Bob managed the mine until a recent call to the armed forces.

Lindsey Belville had worked as a tobacco buyer for 11 yr prior to 1945, when he became interested in a small-scale strip venture near Greasy Ridge. In 1947, he bought out the other interests and organized the present company. Being many miles from a railroad, the mine ships by truck. In 1951, approximately 112,000 tons was trucked to the Solvay chemical plant at South Point, Ohio, which is on the Ohio River midway between Huntington and Ironton. In the same year, approximately 63,000 tons was sold to domestic and other commercial customers.

## 48-IN SEAM MINED

The seam, averaging 48 in thick, ranges from 46 to 52 in and is free of partings. Because of a bad roof, very little underground mining had been done in the area. The bed lies practically level near the tops of hills in rough country where the farm land has comparatively small value. The mining company owns 450 acres underlaid with 180 acres of coal, about 85 acres of which it has already stripped. It also owns leases on enough coal in Mason, Madison and Windsor townships to ensure operation for 20 yr or more.

Immediate top over the seam is 4 ft of slate requiring shooting. Over that is approximately 35 ft of soft sandstone. Most of the sandstone requires shooting but, at the top, grades into a sand that can be readily excavated with pans and bulldozers. The stripping limit set by the company for its new equipment is 45 to 50 ft, which will get 90% of the coal.

## NEW EQUIPMENT PURCHASED

A Cardox-Hardscog "Auger Miner" consisting of a Type DB-CP horizontal drill and 16 28-inx6-ft auger sections was recently purchased to recover thick-cover coal. The portable gasoline-driven elevator used with the auger was made by the General Conveyor & Mfg. Co., St. Louis.

Principal units of new equipment and the dates they were put into service are as follows:

One P. & H. strip shovel with 1½-yd Amsco bucket, driven by a Caterpillar D-13000 diesel (1950).

**LINDSEY BELVILLE** (left), company head and Emil Hartwig, pit foreman.

**LOOKING ACROSS** an active area to the background which has been leveled. Leveling is usually completed within 60 days after stripping is finished.

One Bucyrus-Erie 22B loading shovel with ¾-yd Amsco bucket (1951).

Three Bucyrus-Erie 18-yd pans equipped with Goodyear tires (1951).

Three International TD-24 tractors, 148 maximum drawbar horsepower, for pulling the 18-yd pans.

Two International TD-24 bulldozers (1950).

One McCarthy vertical overburden drill mounted on a Ford V-8 truck (1950).

One International motor grader for cleaning off the top of the coal (1950).

One Jaeger 4-in "Sure Prime" gasoline-powered pump (1951).

One Barnes 2-in gasoline-powered pump (1950).

One Gorman-Rupp gasoline-powered pump (1951).

Investment in new equipment in the last 2 yr also includes the following tipple and maintenance machinery:

Two International U4 gasoline engines to drive tipple equipment.

One Telsmith Size 22P Vibro-King screen made by the Smith Engineering Works, Milwaukee.

One Hobart 350-amp arc welder, gasoline driven.

One Peerless 350-amp welder, electric drive.

## OVERBURDEN MOVED ECONOMICALLY

Approximately 90% of the mine overburden is moved with the tractors and pans. For the most part, the hilltop areas are oblong and there the usual practice is to crop-strip the sides and then work across the end.

Use of the International TD-24 tractors with Bucyrus-Erie 18-yd pans has proved an economical method of moving the overburden. In 6 wk, the equipment uncovered 30,000 tons of coal. In making a 2,000-ft figure-eight round trip moving dirt both ways from the top of a knoll, each TD-24 with pan handled 36 cu yd per trip, totaling 360 cu yd per hour.

Six-inch holes are drilled for overburden shooting, which is done with Hercomite "B" and du Pont explosives fired by Primacord. Coalmaster auger heads and bits are used in drilling. Until purchase of the McCarthy vertical drill, shot holes had been drilled horizontally from the pit.

The TD-24 bulldozers find wide use in preparing ground for the pans, opening crops, moving material cast by the strip shovel and moving boulders too large for the strip shovel or pans to handle. The dozers also build roads and help move equipment that becomes mired in bad weather.

## STRIPPED LAND LEVELED

Leveling of the stripped areas in compliance with the 1948 Ohio strip-mine law is done soon after completion of stripping an area. Leveling is practically always completed within 60 days after stripping.

Coal sold to the Solvay chemical plant is loaded directly into highway trucks, and only about 35% of a year's production is hauled to the tipple for screening, picking and storage. Five sizes of coal can be made and the tipple equipment includes a crusher. Domestic business is confined principally to the 6 mo of July to January, inclusive.

Practically all of the hauling is done by contractors using 8- to 10-ton trucks. Some domestic coal is shipped by rail from a ramp on the N. & W. Ry. near Ironton, and the remainder is sold cash-and-carry from the tipple.

★ ★ ★ ★ ★

## *Signposts to Freedom*

**"The history of liberty is the history of the limitation of governmental power, not the increase of it. When we resist . . . concentration of power we are resisting the power of death, because concentration of power is what always precedes the destruction of human liberties."**

***Woodrow Wilson***

**"Freedom is not now, more than at any other time, something to be preserved; it is something to be created. Freedom cannot be protected; it can only be extended."**

***David Smith***

**"Freedom is placed in jeopardy more by those who will not exercise it than by those who will not permit it. Indifference opens more gates to the enemy than does tyranny."**

***Rev. Edwin McNeill Poteat***

**"The measure of a democracy is the measure of the freedom of its humblest citizen."**

***John Galsworthy***

**"Freedom dies with every individual. It is not reborn with his successors. It must be achieved anew, generation by generation."**

***Henry W. Wriston***

★ ★ ★ ★ ★

**YOU'VE ATTENDED** enough lectures—or perhaps have given enough—to know that too many breed absenteeism and loss of interest in supervisory training.

# Lick Lecture Limitations . . .

**BUT WHEN YOU PARTICIPATE** with other experienced mining men in a "Conference," you'll find it easy to solve problems while learning, and fun, too.

# . . . By Conference Training

By B. B. LUCAS JR., Instructor, School of Mines, West Virginia University, Morgantown, W. Va.

MORE AND MORE TRAINING in industry has been the general trend during the past several years. In the coal industry, we have long recognized the need for training and we have attempted to supply it to remedy peculiar problems in a wide range of activities. Yet, the responsibility for providing and maintaining it in so many areas has, in many cases, become such a burden that much of the training provided is ineffective.

Nevertheless, the magic word "training" is supposed to be good for the individual and the company, and so we round up a class—"a captive audience"—and proceed to train. We tend to apply the same approach to all our training problems, with the lecture method usually employed to teach all classes in all subjects. The results are familiar. Absenteeism among the class members is high, unless they are required to attend, and interest is low. But the worst result is the building-up of resentment against further training.

Of course, it is impossible to keep every individual interested in every class, but it is possible to improve the general interest and effectiveness of training in several ways. One way is to vary our methods. This discussion will be limited to the use of the "conference" method as an effective substitute for the lecture. A quick look at this relatively new training concept will suggest its application to many training situations.

## HOW THE CONFERENCE WORKS

With the conference method, a relatively small number of people, of equal supervisory rank, sit down around a table to arrive at solutions to problems—under the guidance of a conference leader. This situation differs from the usual notion of a conference in that it is designed to train people by *utilizing their own experiences*. The leader need not be well informed on the discussion subject, but he must be well informed on conference techniques. He is not a lecturer or teacher, but his skill in keeping the discussion in order and on the problem is the key to the success of the conference. He never gives an opinion, but lets the group form opinions, conclusions and recommendations. Thus, the conference is much more than a bull session.

Since the ideas come from the group instead of from the leader, it is immediately apparent that the conference may not be employed to relay new information to a group. But think of the helpful "old" information that could come out of a conference of 20 foremen, who have had an average experience of 10 yr each. Here is 200

yr of experience from which to draw. Would it not take a rather large textbook to put into print the information possessed by this aggregate experience?

### PRACTICAL EXPERIENCE IS USED

Of course, this 200 yr will not produce answers to complicated engineering problems, because the experience did not necessarily include higher mathematics, chemistry and physics. However, that experience does include 200 yr of the know-how of practical coal mining. Obviously much of it is duplicated but, on the other hand, it is diversified. One man will have been exposed to experiences that may be quite different from those of his fellow foremen. To solve a problem, then, the conference has at its disposal many years of experience, plus 20 different viewpoints.

Suppose you have been assigned to teach a group of 20 foremen in the principles of foremanship. How will you teach it? Most of us have either taught or have been taught in such a class, so it serves as a good illustration for the use of the conference technique. The usual procedure in foremanship classes is to have each of the 20 men sit down at a school desk and chair and listen for an hour or so to a lecture for a number of sessions.

The lecture begins with one of several introductions: duties of the foreman, characteristics of a good foreman, and so forth. Often the speaker takes his theme from a standard book on the subject, with no apparent recognition that problems encountered in the daily work of the face boss are altogether different from the problems of the white-collar foreman in other industries. It is little wonder that we get the kind of reaction from these foremen that we do when we approach the subject in the traditional manner. We might as well face the facts: unless attendance is compulsory, we often run out of listening material before the course is completed.

### SOLVE PROBLEMS IN LEARNING

Contrast such a lecture class with a series of conferences on foremanship. Twenty foremen sit down around a conference table, with the idea and the understanding that they are to do the talking. After the leader's explanation that they are to discuss foremanship, you can bet that these foremen will have their own ideas of what they are interested in and what they want to talk about. One thing is certain: they will not approach the subject in the Boy Scout manner. They feel, and rightly so, that if they did not possess the necessary personal characteristics for the supervisory positions they hold, they would not have been appointed to them in the first place.

Under such conditions, the men will immediately settle down to solving problems that occur from day to day on their various sections. Again assuming that the conference is blessed with long years of experience, it will solve many of the problems brought up for discussion. While the problems are being solved in this manner, information usually provided by a lecture will incidentally evolve from the discussions. It will not come out in the nicely organized package provided by the lecture, but when it comes from the group it will be accepted by them. Seldom will you find a coal miner who has more faith in a textbook than he does in years of experience.

While training in foremanship is the proper place to begin your use of the conference method, it is by no means the only place where it is of value. The conference is most effective where the subject is controversial. Thus, wherever problem-solving is involved in your training program, use the conference. Another important use for it is in improving communications both up and down the line. Whether or not your organization believes in the participation of first-level supervision in policy formulation, the conference is the place to discuss and clarify company policy and practices.

### MAKES CLASSES PLEASANT

With the proper setting and an active group of conferees, the conference method of training is really "fun while you learn." The only hitch to what is otherwise the answer to the trainer's prayer is the conference leader. Upon him rests the success or failure of the conference. It can be a dynamic learning process, or it can be a bull session, depending on the skill of the leader. This skill is not inborn. However, any mature individual can acquire the skill by study and practice. There are several good publications on the art of conference leadership, and ample opportunity to gain experience exists at every coal operation.

The successful conference will take the "teacher" out of the learning situation. Those being trained are no longer "trainees" or "students," but are, instead, "conferees." The teacher becomes the conference "leader," the classroom the conference room. The antagonism of many adults toward such terms as "education," "learning," "training," "teacher" and "school" may be greatly relieved. Aside from the obvious educational values and solutions to many problems derived from the conference, a helpful sense of teamwork and mutual understanding develops among the conferees.

For the training department, the method is a welcome relief from the slow and painful process of lecturing.

## Conference Do's and Don'ts

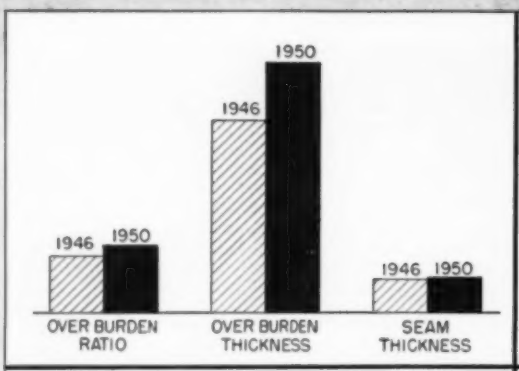
There are certain basic points to observe in a training program utilizing the conference method. Perhaps the biggest error committed by training departments is permitting visitors to sit in on the conferences. A conference leader, even though subordinate to higher management, is under no obligation to throw his conference open to the general public. The conference members must be of equal rank in the company supervisory structure, and one sure way to clam up the conferees is to have an official from a higher level "sit in."

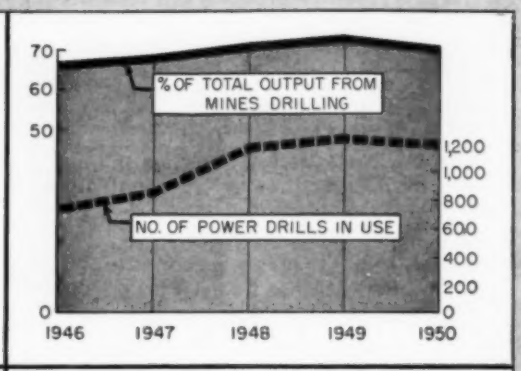
On the other hand, a short visit by a higher management representative at the beginning of the initial conference is desirable when the purpose of the visit is to impress the conferees that the company has a genuine interest in the undertaking. A short talk to the group serves this purpose well.

The conclusions reached by the conference may have involved much discussion which was of a "just-among-ourselves" nature. The conclusions are what is important—not what was said in reaching them. So the superintendent or other official should not be concerned with the conference process itself, but what comes out of it. The results of the conference will be handed to all interested parties in a neat package, in clear concise words that will not take long to read. Many words and ideas are worked down to usable form. That is what the busy executive is looking for anyway, and that is what pays off in the final analysis.

You cannot hold a conference just anywhere. The local grade school or the mine-foreman's office is the proper place unless the equipment, consisting of a conference table, chairs and blackboard, is provided for the purpose elsewhere. The environment must be conducive to straight thinking. Noise and distraction must be kept to a minimum.

The ideal time for the conference is from 10 to 12 am, on company time, but where the company is small or other conditions prevail, the time must be arranged to meet local situations. The conference should not exceed 2 hr at any one session.




**Overburden at Bituminous and Lignite Strip Mines**

| Year | No. of Strip Mines | Mined by Stripping (Net Tons) | Overburden Excavated Cu Yd per Net Ton of Coal Mined | Average Thickness (Ft) | Coal Seam Mined Avg. Thickness (Ft) |
|---|---|---|---|---|---|
| 1946 | 1,445 | 112,963,717 | 9.1 | 31.6 | 5.2 |
| 1950 | 1,870 | 123,466,564 | 10.7 | 39.0 | 5.3 |

**Power Drills Used in Bituminous and Lignite Overburden**

| Year | Mines Using Power Drills in Overburden | Tonnage, Mines Drilling Overburden | Percentage Total Strip Production | Number of Power Drills in Use |
|---|---|---|---|---|
| 1946 | 514 | 75,375,841 | 66.7 | 764 |
| 1947 | 598 | 95,915,346 | 68.8 | 875 |
| 1948 | 788 | 98,809,393 | 72.3 | 1,195 |
| 1949 | 756 | 78,146,655 | 73.7 | 1,256 |
| 1950 | 692 | 87,205,280 | 70.6 | 1,201 |

# What Does Overburden Average?

By W. H. YOUNG, Chief, Bituminous Coal Section, and R. L. ANDERSON, Engineer-Economist, Bureau of Mines, Washington, D. C.

THE VOLUME OF OVERBURDEN handled at coal strip mines is so large that it is difficult to comprehend. The Panama Canal, completed in 1914, necessitated excavation of 240 million cu yd of earth and rock. Based on the 1950 factor of 10.7 cu yd of overburden excavated per ton of clean coal mined by stripping, bituminous-coal and lignite mines in the United States excavated 1,300 million cu yd of overburden in 1950—or enough to build five Panama Canals.

## Overburden Thickness and Yardage Removed Both Increasing in Coal Stripping

The most important factor in the cost of stripping coal is cubic yards of overburden handled per ton of coal mined. The Bureau of Mines has collected and compiled statistics on overburden for 1946 and 1950, and the results are presented in this article. Each strip mine was asked to report both the thickness and yardage of overburden excavated. The reports covered a substantial proportion of the strip production of bituminous coal and lignite, and it is believed that they are representative of the entire industry. For 1950, mines producing 63% of the total output reported thickness of overburden and mines producing 53% of the total reported yardage.

Overburden excavated has been increasing in recent years, as shown in the statistics summarized in the accompanying table. Average thickness rose from 31.6 ft in 1946 to 39 ft in 1950. Cubic yards removed per ton of coal mined increased from 9.1 in 1946 to 10.7 in 1950. There were wide variations between the various states, with the greatest increases in overburden recorded in Virginia, Montana and Ohio. In other states, such as Pennsylvania and West Virginia, where stripping is generally in mountainous areas, advanced hillside stripping also has encountered heavier overburden.

The average thickness of the coal seam at strip mines was approximately 5 ft in 1950. There were large variations in seam thickness, ranging from an average of 3 ft in Missouri to 38 ft in Wyoming. The ratio of thickness of overburden to thickness of coal seam is a very important factor in stripping operations. In 1950, the average thickness of overburden handled was eight times that of the coal mined.

## Rise in Drill Use Reflects Thicker Burden

The use of power drills in overburden at strip mines has been increasing in recent years as a result of the heavier overburden and expansion into areas where it is necessary to drill and blast before stripping.

The Bureau of Mines asked strip operators to report power drills used in overburden for a number of years past, and the figures for 1946 to 1950 are summarized in the accompanying table. The proportion of total strip production coming from mines that drilled and blasted overburden increased from 66.7% in 1946 to 70.6% in 1950. The number of drills in use rose from 764 in 1946 to 1,201 in 1950, or 57%. Of the total drills in use in 1950, 799 were of the horizontal type and 402 were vertical units.

Detailed statistics by states of overburden thickness and yardage and the use of power drills have been published by the Bureau in Weekly Coal Report 1803, dated April 4, 1952.

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UTILIZATION, EQUIPMENT AND MACHINES—G. B. Southward, mechanization engineer, and Julian Conover, executive vice president, AMC; C. W. Connor, Defense Solid Fuels Administration; Joseph Pursglove, Jr., Pittsburgh Consolidation Coal Co.; E. T. Klett, DSFA; H. A. Montag; National Production Authority; and H. H. Taylor, Jr., Franklin County Coal Corp., session chairman.

# AMC Scans Progress, Probes Future

**Coal Men Hear Reports on . . .**

**Today's best uses for men and equipment**
**Modern trends in coal preparation**
**Machines and methods for tomorrow's mines**
**Utilization and transportation in years ahead**
**Stripping methods and land reclamation**
**Safety and health for the industry's workers**

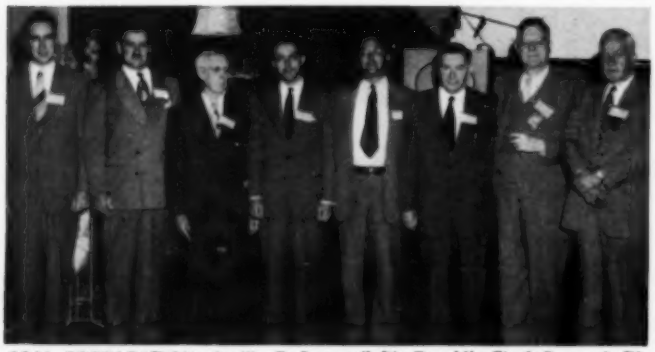
STRIPPING DEEP OVERBURDEN—Arthur F. Lee (left), Truax-Traer Coal Co.; George A. Roos, Philadelphia & Reading Coal & Iron Co., session chairman; and Paul Goddard, Carey, Baxter & Kennedy.

MORE THAN 2,000 COAL MEN, equipment manufacturers and representatives of railroad and allied interests, converging on Cincinnati May 5-7 for the 29th annual meeting of the Coal Division, American Mining Congress, heard how to cut deep- and strip-mining costs with existing equipment and manpower, listened to reports on trail-blazing machines and methods that may bring radical changes in American mining practices, and glimpsed a future in which coal utilization and transportation may take on an entirely new look.

They also scanned progress in safety, preparation, underground and surface haulage, roof control, maintenance, power distribution and strip-land reclamation and, with the help of government officials, took a look at prospects for mining equipment and supplies in the defense program.

Advances in coal mining over the past quarter-century have revolutionized and strengthened the industry, said Julian Conover, AMC executive vice president, who opened the convention Monday morning. He asserted that coal has pushed its frontiers forward under the American system of free, competitive capitalism, without subsidy or other help from the federal government. "We must keep it that way," he said, presenting H. H. Taylor, Jr., president, Franklin County Coal Corp., Chicago, who presided at the opening session.

***INDUSTRY MEETING—***
***A Special COAL AGE***
***Staff-Written Report***



**COAL PREPARATION**—Orville R. Lyons (left), Republic Steel Corp.; J. W. MacDonald, Old Ben Coal Corp.; S. M. Parmley, consulting engineer; J. P. Blair, Heyl & Patterson; Milo W. Summers, Westmoreland Coal Co.; John E. Dunn, Allis-Chalmers Mfg. Co.; R. G. Pfahler, Berwind-White Coal Mining Co., floor committee; J. B. Morrow, Alford, Morrow & Assoc., session chairman.

**NEW DEVELOPMENTS**—C. E. Lawall (left), Chesapeake & Ohio Rwy. Co., session chairman; L. J. Redding, Rochester & Pittsburgh Coal Co.; R. D. Hedreen, E. I. du Pont de Némours & Co., Inc.; Richard Todhunter Jr., Barnes & Tucker Co.; Murton Gullick, Mavor & Coulson, Ltd.; A. B. Crichton, Jr., Johnstown Coal & Coke Co.; W. A. Haley, USBM; Louis Frost, Dosco.

**ROOF SUPPORT**—John A. Stachura (left), Enoco Collieries, Inc.; James L. Gilley, USBM; Donald B. Shupe, Eastern Gas & Fuel Associates; J. P. Horne, Jewell Ridge Coal Corp., floor committeeman; J. W. Woomer, J. W. Woomer Associates, session chairman; J. L. Lambert, Jeffrey Mfg. Co.; and C. E. Linkous, Island Creek Coal Co.

## *The Outlook—Equipment and Markets*

**"Cutting the cost of electric power by 20% would double the market for coal and electricity."**

"I wonder if coal's long-range planning now is any better than it was 50 yr ago," said Joseph Pursglove Jr., vice president—research, Pittsburgh Consolidation Coal Co. Speculating about the years ahead against a background of coal's marketing history, Mr. Pursglove noted four trends characterizing today's markets. These trends are:

1. The use of finer sizes is increasing. Soon, there may not be any market for sizes larger than 1½ in because more and more big customers are crushing coal before burning it and are buying coal on a Btu basis rather than on a size basis.

2. In fast-growing markets, notably the chemical industry, size does not matter as much as the chemical properties of the coal used.

3. Domestic and small-plant coal users are shifting to oil and gas.

4. Whereas the electric utilities used to buy a by-product of the coal industry, i.e., fine coal, they now realize that they are buying a major product and, in some instances, are aware that they must pay a better price.

To offset past tonnage losses and to build larger markets than before, Mr. Pursglove saw five possibilities, as follows:

**1. Expanding markets for coal under boilers where oil and gas now are used.** This can be achieved not only by reducing mining costs but also by finding cheaper means of transportation to market. Whereas the cost of moving oil and gas to market has gone down in recent years, rail-freight charges for coal have soared upward. The answer to coal's problem may lie in pipeline transportation of coal and in generation of more electric power at the mine mouth.

**2. Promoting ways to produce and distribute electricity at lower cost.** Coal men can help the utilities in planning this move by bringing power plants closer to mines and by investigating the possibilities of ultra-high voltage transmission jointly with the power industry. Cutting the cost of electric power 20% would double the market for electricity and coal. Potential power consumption is immense, notably in the aluminum and chemical industries. Power can be made cheaply from coal, and industry members ought to shout that fact from the housetops.

**3. Supplementing natural gas with gas made from coal.** Providing 10% of the Nation's demand for gas would call for 100,000,000 tons of coal per year.

**4. Conversion into liquid fuels by hydrogenation.** Citing the fact that European plants that once hydrogenated coal to make liquid fuels now are hydrogenating residual oil, Mr. Pursglove called for

new thinking on synthetic liquid fuels in this country. He expressed confidence that the economic hurdles can be cleared with research, originality and adequate investment and pointed out that providing 10% of the Nation's demand for liquid fuels would add 180,000,000 tons per year to coal's markets.

**5. Partial conversion of coal through low-temperature carbonization.** Advances along this line will speed progress in the four market possibilities listed above. Liquids from low-temperature carbonization can be upgraded to top-rank products and the residual char sold to electric utilities at a cost comparable to that of residual oil. Capital investment costs would be low compared with capital needs for a hydrogenation plant.

### "The outlook for materials, supplies and equipment for coal mines for the 12 mo ahead is optimistic."

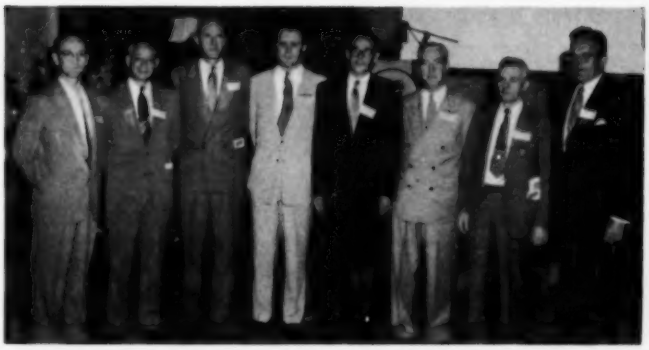
Discussing recent activities on the defense front that affect the operating and expansion needs of the coal industry, Charles W. Connor, Defense Solid Fuels Administrator, said that the industry's essential needs to date have been promptly filled. The self-rating priority system obtained for coal by DSFA appears to be working smoothly and DSFA has been able to give special attention to emergency needs and problems. For instance, DSFA has recommended authorization by National Production Administration for 150 coal-mine projects costing some $160,000,000, mostly for metallurgical coal.

Barring new aggressions abroad and a long stoppage in steel, the outlook for the next 12 mo for materials and supplies for coal mines is optimistic, Mr. Connor said. He warned the industry against seeking hasty abandonment of controls during the emergency mobilization period. The stretch-out of the defense program, he explained, does not mean a cutback in defense goods but, instead, looks forward to a still bigger defense program. The need for controls therefore will continue, especially in scarce materials, he said.

Red aggression in Korea in 1950 caught the United States with no slack in its industrial plant, **Edward T. Klett,** deputy administrator, DSFA, said. The objectives of the defense program therefore were: (1) to meet the Korean emergency and (2) to build up the Nation's industrial capacity. Controls therefore were necessary. Mr. Klett explained new regulations of NPA and the Controlled Materials Plan, dwelling especially on NPA Order M87 and CMP Regulation 6, the former providing a self-rating priority system for coal on MRO needs, the latter for plant-expansion needs. Both regulations provide for some flexibility, especially in filling the needs of small operations.

A good many DSFA and NPA forms have been revised, Mr. Klett reported. He urged coal men to keep themselves up-dated on these revisions and thus to speed fulfillment of their needs.

On the outlook for mining machinery



**SAFETY AND HEALTH**—J. T. Parker (left), Inland Steel Co., session chairman; C. W. Thompson, Weirton Steel Co.; J. W. Hardy, Goodman Mfg. Co.; E. D. Conaway, Robinson & Robinson; F. F. Stewart, Jewell Ridge Coal Co.; R. E. Doherty, The Anthracite Institute; Arthur Bradbury, Inland Steel Co.; and F. G. Smith, Sunday Creek Coal Co., floor committeeman.

**POWER AND MAINTENANCE**—E. R. McMillan (left), Northwestern Improvement Co., session chairman; T. R. Workman, West Virginia Coal & Coke Co., floor committeeman; W. H. Carter, West Virginia Coal & Coke Co.; Evan Adams, Jefferson Coal Co.; I. M. Charles, Union Pacific Coal Co.; W. R. Wood, Berwind-White Coal Mining Co.; and G. W. Stump, Rochester & Pittsburgh Coal Co.

**CONTINUOUS MINING**—W. B. Jamison (left), Jamison Coal & Coke Co., session chairman; G. S. Jenkins, Bell & Zoller Coal & Mining Co., floor committeeman; J. A. Younkins, Duquesne Light Co.; Gerald von Stroh, Mining Development Committee, BCR; H. C. McCollum, consulting engineer; F. R. Zachar, Christopher Coal Co.; and Milton H. Fies, Alabama Power Co.

**STRIP-MINING**—Frank F. Kolbe (left), United Electric Coal Cos., session chairman; J. S. Harmon, Hanna Coal Co.; Samuel F. Sherwood, Central Indiana Coal Co.; Fred Horne, Sinclair Coal Co.; Talhurst Butler, Central Pennsylvania Quarry Stripping & Construction Co.; and John L. Romig, Atlas Powder Co.

**UNDERGROUND HAULAGE**—A. E. Long (left), Clearfield Bituminous Coal Corp.; B. M. Neel, Stonega Coke & Coal Co.; Lyle Morris, Peabody Coal Co.; W. R. Kirkwood, T.C.I.; W. A. Haslam, The New River Co.; James L. Hamilton, Island Creek Coal Co., session Chairman; and Frank G. Smith, Sunday Creek Coal Co., floor committee.

in the months ahead, Harold A. Montag, director, Mining Machinery Div., NPA, predicted that steel and aluminum may be decontrolled by the end of this year if no incident upsets scheduled production and consumption. Copper, however, will remain scarce and must be kept under controls. NPA should decontrol materials with all speed consistent with the defense needs of the Nation, he said.

Long-range strength, with raw materials at the base of that strength, is necessary for national safety, Mr. Montag said. Since critical raw materials are provided by the mining industry, planning for that industry must be long-range so that full production can be achieved on short notice. War would mean an increase in energy demand and disappearance of some fuels from ordinary markets. Coal therefore must be kept strong and ready for any emergency.

## *Better Methods for Deep Mining*

### "Soon, we plan to use dust collectors exclusively at our mines."

Use of dust collectors exclusively is planned for mines of Island Creek and associated companies as soon as the U. S. Bureau of Mines gives formal approval, said C. E. Linkous, director of safety for those companies. He was the first speaker at the roof-support session Monday afternoon, J. W. Woomer, J. W. Woomer & Associates, presiding.

The dust count when dust collectors are used is much lower than when wet drilling is used, Mr. Linkous reported. It is almost impossible to get drillers to use water voluntarily during collaring in wet drilling but they will use dust collectors voluntarily. Dust collectors afford full-time protection. Although overall cost of protection is slightly higher with dust collectors, their small size and portability make them easily adaptable to the mining cycle. Mr. Linkous offered comparative data on drilling speed, roof-bolting time per place, initial costs and maintenance costs for several mines, some using wet drilling and others dry drilling with dust collectors.

### "It is our intention to extend roof-bolting over the whole mine."

Though direct roof-control costs are slightly higher in a section with roof-bolting, the company intends to extend roof-bolting over the whole mine, said Louis F. Lumaghi, president, Lumaghi Coal Co. Mr. Lumaghi's paper was read by John L. Lambert, Jeffrey Mfg. Co. The company drills roof-bolt holes wet with rotary drills. The following gains are being made with roof-bolting:

1. Better roof control.
2. Fewer roof-fall accidents.
3. Lower cost for delivery of roof-control materials.
4. Recovery of coal formerly lost behind timbers, making the mine cleaner and easier to rockdust.
5. More clearance around cars and machinery.

The bolting is done with a Jeffrey roof drill pulling a trailer carrying 300 gal of water and a supply of bolts. Water pumped through a 0.3-in hole through the $^{15}/_{16}$-in drill stem comes out onto the point of the Kennametal bit and also around the cotter key holding the bit to the stem. For drilling, the socket turns at 480 rpm; for tightening, 240 rpm, at which it develops a 225-ft-lb torque with a hydraulic pressure of 1,400 psi. Bolts are $^{3}/_{4}$x48 in and are anchored into Ohio Brass shells with pal-nuts. Between the $^{3}/_{4}$-in malleable iron washer and roof is a 3x6x18-in oak block.

In open-ended extraction of pillars, roof bolts alone, without sufficient breaker posts, cannot be used successfully or safely, said J. L. Gilley, USBM, Mt. Hope, W. Va. With proper breaker posts, roof-bolting in pillar recovery has resulted in safer mining and points to the possibility of improving existing mining methods and introducing new methods. Mr. Gilley described experience with roof-bolt pillar recovery in five West Virginia mines over a 3-yr period.

In one of these mines, where 969,336 tons of coal was produced with only one lost-time accident attributed to bolt support in pillar extraction, Mr. Gilley saw the following advantages:

1. Daily production increased.
2. Delays from roof falls practically eliminated.
3. Cost of coal reduced.
4. Development and extraction sped.
5. Percentage of recovery increased.
6. Rock handling reduced.
7. Haulage facilitated.
8. Accidents from roof falls in pillar mining reduced.

Mr. Gilley emphasized the need for preliminary investigation and advice before starting a roof-bolting program and the need for good workmanship in installing bolts. If full benefit of roof-bolting is to be secured, an effort should be made to get full extraction to obtain successive roof falls over small areas close to the pillar line. Open-ended extraction without breaker posts destroys the base at one end of the beam which is created by the roof bolts.

**STRIP-LAND RECLAMATION**—F. J. Foresman (left), Pittsburg & Midway Coal Mining Co.; A. J. Christiansen, Illinois Coal Strippers' Association; Larry Cook, Ohio Reclamation Association; T. C. Cheasley, Sinclair Coal Co.; R. L. Ireland, Pittsburgh Consolidation Coal Co.; L. E. Sawyer, Indiana Coal Operators' Association; and Clifford Adams, National Coal Association.

**"The use of roof bolts reduces the cost of handling supplies—24% lower in 1951 than in 1950."**

Recovery of coal in bad top areas has been increased approximately 5% without increasing width of rooms or entries, said John A. Stachura, general superintendent, Enoco Collieries, Inc. Mr. Stachura's paper told of experience in the 6,200-ton Enoco mine, where four of the nine units now use roof-bolt support in the regular cycles of operation. In a section of the mine with bad top, the supply cost of roof control by bolts was 2.42c per ton higher than with timbering but the labor cost was 10c per ton less, showing a net saving of 7.58c per ton favoring roof-bolting.

Bit life in rotary drilling was extended by exerting maximum pressure at slow speed, Mr. Stachura said. An improvement was made by dropping the hydraulic rotary drill bit to the bottom for actual drilling, thereby reducing strain on the front end of the machine and eliminating the vibration formerly encountered in hard drilling. Over a period of 75 shifts of operation, the crew applied an average of 101 bolts per shift. The maximum was 187 5-ft bolts installed in one shift.

Bolting brought the following advantages to the mine, Mr. Stachura said:

1. Improved safety.
2. Increased production per shift.
3. Greater tonnage per acre.
4. Continued operation of higher equipment.
5. Increased efficiency of roof-control crews because of lighter work.
6. Savings in labor and supplies.
7. Increased mobility of all equipment.
8. Improvements in ventilation.
9. Elimination of wood and cap pieces in the loaded coal.

J. B. Haskell, research engineer, West Virginia Steel & Mfg. Co., in a discussion of the overall economics of roof-bolting, called attention to the many advantages of roof-bolting that are not easy to evaluate. The long-term evaluation may show a much greater saving than the short-range evaluation. The West Virginia Department of Mines has reported that in the past 3 yr roof-bolting has saved 137 lives in the state and that falls of roof have dropped from first to second place among causes of accidents.

In a brief question-and-answer period at the end of the roof-control session, the following points were brought out: Donald B. Shupe, superintendent, Eastern Gas & Fuel Associates, Kimball, W. Va., reported that no recovery of bolts is attempted. Mr. Gilley said that prevention of floor upheaval by bolts has been tried by some operators in the West. There are indications that it may be worth while but experience thus far is too limited for sound conclusions.

**"Planned methods and timing materially accelerated the completion of the initial development period."**

Careful planning and scheduling of shaft and slope sinking has made it possible to put the new Peabody Coal Co. No. 10 mine into operation before the date originally set, reported Lyle Morris, division engineer, Taylorville, Ill., in a discussion of sinking methods opening the underground-haulage session, with James L. Hamilton, vice president—operation, Island Creek Coal Co., presiding. The operation, designed for all-belt haulage and a capacity of 13,200 tons in two shifts, lies under 350 ft of cover. Access is by a 15-ft circular concrete-lined air shaft 350 ft deep and a 1,502-ft belt slope on 16 deg with a 6-ft belt compartment and an 11-ft manway and trackspace, both 8 ft high. The slope belt will be fed from a 1,000-ton underground hopper.

Sinking of the air shaft and construction of the upper portion of the belt slope 314 ft down through 80 ft of soft material was awarded to Dravo. The remainder of the belt slope was driven by the Peabody organization working from both the top and from development from the air shaft on the bottom. Raising of the lower portion of the slope was done with three-drum slusher mounted on a loading-machine head and discharging to a rail car made from an old battery shuttle car. After the first 75 ft, the shuttle car dumped into a glory hole acting as a hopper for shuttle cars dumping the muck in gob rooms.

Meanwhile, Mr. Morris reported, Dravo was sinking the upper portion of the slope by means of reinforced-concrete caissons. Next,, sinking in the rock was done with a Joy loader controlled at the face by a hoist and discharging to a trackmounted shuttle car. Air shaft and slope were completed in 12 mo, with the average advance in the lower portion of the slope 7.34 ft per day and in the upper portion 7.19 ft, including steel timbering and guniting. Crews were eight men on two shifts and four on the third, or maintenance, shift.

The 48-in steel-cable-reinforced belt will be 1,729 ft between centers, with a vertical lift of 476.5 ft and a speed of 475 fpm. Capacity is 1,000 tph. The drive will be three 250-hp motors for higher efficiency and convenience in installation and repair.

**"To insure a successful operation, people working in the face areas must receive maximum service."**

Haulage underground must be designed and operated with efficiency at the face as the goal, declared Walter R. Kirkwood, chief inspector, Tennessee Coal & Iron Div., U. S. Steel Co., Fairfield, Ala. After the proper facilities are provided, their operation must be coordinated by good dispatching. A major aid to dispatching efficiency, in addition to contributing to safety and flexibility, is the trolleyphone, which also promotes teamwork. Two other pieces of equipment cited by Mr. Kirkwood as contributing to safety and dispatching efficiency are automatic block signals and electric switches.

"Conventional telephones, hand-operated block signals and track switches are still being used in our mines," Mr. Kirkwood concluded. "It is not the intention to infer that they do not have a place in modern mines. They do have a place in controlling underground traffic. It seems that a combination of them, trolleyphones, automatic block signals and elec-

**Continued on p 166**

**UTILIZATION**—W. H. King (left) Kingston Cake Co.; G. E. Lewis, Glen-Gery Shale Brick Co.; Miss V. I. Schlacks, Philadelphia & Reading Coal & Iron Co.; N. C. Curtin, the Anthracite Institute; and J. B. Warriner, Lehigh Navigation Coal Co.

# Anthracite Seeks Bigger Markets

**New uses explained, better merchandising urged and first commercial vacuum ash-removal system described in two-day meeting of more than 200 industry leaders at 10th annual Anthracite Conference**

MORE AGGRESSIVE MERCHANDISING as the most critical need of the industry and intensive research to widen the field of anthracite utilization were major themes of the 10th Anthracite Conference held at Lehigh University, Bethlehem, Pa., May 8-9.

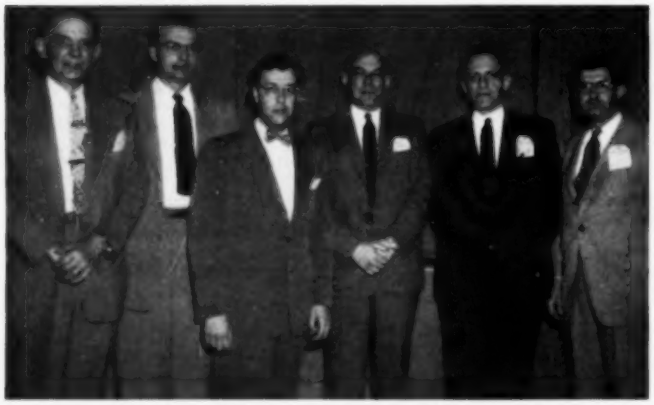
The more than 200 industry leaders in attendance heard 18 speakers cover the status and problems of anthracite. The program was arranged by a committee headed by Dr. R. T. Gallagher, head, Department of Mining Engineering, Lehigh University, who served as general chairman of the conference, and Dr. R. C. Johnson, vice president—research, the Anthracite Institute, as vice chairman.

**Speakers and their subjects** at the Thursday morning session were: Miss V. I. Schlacks, advertising manager, Philadelphia & Reading Coal & Iron Co., Philadelphia, on **A to Z Uses of Anthracite;** N. C. Curtin, supervisor, field representatives, the Anthracite Institute, New York City, on **Smoke Abatement;** G. E. Lewis, chief engineer, Glen-Gery Shale Brick Co., Reading, Pa., on **Use of Anthracite Gas Producers in Brick-Making;** and W. H. King, chief engineer, Kingston Cake Co., Kingston, Pa., on **Anthracite Producer Gas in Modern Bake Ovens.** J. B. Warriner, senior director, Lehigh Navigation Coal Co., Lansford, Pa., was session chairman.

Competition is the life-blood of industry but it must be recognized, Miss Schlacks stated, in citing as examples the phonograph-record industry in its response to the threat of radio, and radio in its response to television. Running through the alphabet of anthracite's uses, from asbestos beneficiation to zinc-oxide production, she pointed out that anthracite contributes directly or indirectly to the life of each American. Closing on the note that the full automatic-heating potential of anthracite is yet untapped, Miss Schlacks urged continued research in equipment design and customer service.

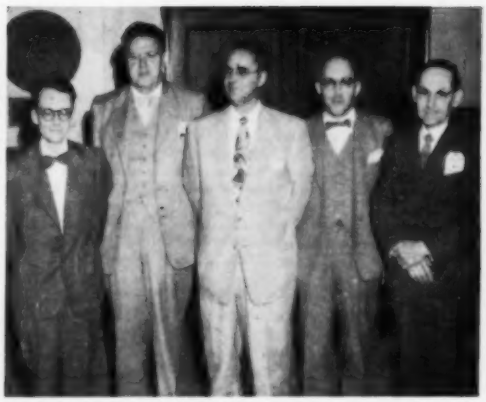
"The time-worn adage that smoky chimneys are a symbol of economic well-being is succumbing to a new slogan—'Citizens are entitled to air as pure as the water they drink.'" declared Mr. Curtin, in describing how the Anthracite Institute is prepared to offer engineering service to help communities solve smoke problems, to supply educational materials and to train appointed smoke-abatement officials.

In small communities, voluntary programs may reduce smoke, Mr. Curtin said, but in large communities legal authority must be wielded against offenders more often than not. In the final analysis, a good smoke-control program is far less costly than the direct damages arising from uncontrolled smoke, Mr. Curtin reported, in pointing out how most effective control programs in eastern



**BURNERS AND ASH DISPOSAL**—N. H. Gebhardt (left), G. J. Gebhardt Coal & Coke Co.; J. J. Hassett, Jr., Elmira Coal Co.; Robert Loomis, Hershey Machine & Foundry Co.; H. H. Shaver, The Hudson Coal Co.; Dr. R. T. Gallagher, Lehigh University; and R. H. Hampton, Beaumont Birch Co.

**SALES AND USES**—W. P. Bloecher (left), Philadelphia & Reading Coal & Iron Co. and Berks Building Block Co.; George Applin, The Hudson Coal Co.; Dr. W. C. Schroeder, USBM; and Dr. J. A. Weybrew, North Carolina State.



**HEATING AND COMBUSTION**—Howard Grendon (left), Pennsylvania State College; C. J. Farrell, Design Service; Dr. C. C. Wright, Pennsylvania State College; Dr. R. C. Johnson, the Anthracite Institute; and J. F. Barkley, USBM.

cities have resulted in substantial anthracite gains in those areas.

Anthracite producer gas permits his company to turn out better brick with greater efficiency, Mr. Lewis said. The Glen-Gery installation consists of a tunnel kiln through which cars of brick to be fired are moved. The kiln is heated by burning gases from a Wellman-Galusha producer. The efficiency of this installation probably is 100% greater than the previous method of hand-firing the kilns with bituminous, anthracite or wood. Furthermore, the process is susceptible to closer control, flyash is no problem, there are fewer rejects because of insufficient or excess burning, and the materials-handling processes are substantially simplified.

In burning 230,000 brick per week, savings in fuel and labor costs amount to about 50% over the previous method of hand-firing bituminous in periodic kilns, Mr. Lewis reported. Glen-Gery has one unit in service, a second is under construction and a third is in the planning stage.

Use of anthracite producer gas at the Kingston Cake Co. bakery permits more efficient plant design, a cleaner food-processing environment and complete independence of any outside source of fuel gas, Mr. King stated. Usually, bake ovens fired with solid fuel are located against an outside wall to permit easier handling of the coal and ash, but ovens fueled with producer gas can be placed in the most effective position in the production line. Scrubbed products of the gas producer keep the bakery clean. High seasonal loads on a public gas pipeline can disrupt bakery operations but producer gas is there when you need it. At the Kingston bakery, the producer is across the street from the ovens at a location most convenient for handling coal and ash, and the gas is carried under the thoroughfare through a 10-in main. About 88% of the Btu in the coal is recovered in the cleaned and cooled producer gas, Mr. King reported, in pointing out that cheaper, smaller sizes are used in contrast to the large sizes used in hand-firing. Also, labor cost in gas-producer installations generally is lower.

**At the Thursday afternoon session,** subjects and speakers were: **Chemicals, Pipeline Gas and Liquid Fuels From Coal,** by Dr. W. C. Schroeder, assistant director, USBM, Washington, D. C.; **The Effects of Sulphur Dioxide in the Tobacco-Curing Atmosphere,** by Dr. J. A. Weybrew, North Carolina State College of Agriculture & Engineering, Raleigh, N. C.; **Drying Alfalfa With Anthracite,** by Charles Sanford, Illinois Stoker Co., New York City; **Merchandising Anthracite in Face of Gas Competition,** by George Applin, administrative assistant, The Hudson Coal Co., Scranton, Pa.; and **Use of Anthracite in Making Cinder Block,** by W. P. Bloecher, assistant to the president, Philadelphia & Reading Coal & Iron Co., and president, Berks Building Block Co., Philadelphia, Pa.

The coal industry cannot afford to wait for others to prove the methods and economics of producing liquid fuels from coal, Dr. Schroeder said, in pointing out that the basic research must be carried forward as rapidly as possible so that the coal industry and the government can show the true position of coal in the fuel picture of the future.

In presenting a paper in cooperation with H. B. Puckett, research professor, Department of Agronomy, N. C. State College, Dr. Weybrew described how some tobaccos cured in the presence of combustion gases from anthracite show a mottled appearance that tobacco buyers dislike. Sometimes the leaf is punctured and the hole is surrounded by a discolored ring.

***INDUSTRY MEETING — A Special COAL AGE Staff-Written Report***

In a discussion of Dr. Weybrew's paper, Paul White, field representative, the Anthracite Institute, Philadelphia, described efforts to reduce this mottling effect by redesigning the curing sheds. This summer's work along these lines should put anthracite in a favorable competitive position, Mr. White declared.

Mr. Sanford's paper, presented by E. L. Wilson, utilization engineer, Lehigh Navigation Coal Co., described the crop-drying activites of Schoeneck Farms, Macungie, Pa., where alfalfa is mowed, chopped, transported, flash-dried, cooled and bagged for storage in a continuous operation. The advantages of heat drying, Mr. Sanford stated, are better scheduling of operations and a higher-vitamin, higher-chlorophyll product. The process retains more of the original nutrient in the feed than other curing methods, he said.

Something must be sold before the anthracite merchandising situation clears, Mr. Applin declared, in explaining that the ultimate users of anthracite must be sold on the need for anthracite in processing the end products they use. For example, Mr. Applin said, the industry should extend the effort to sell anthracite to tobacco farmers by conditioning smokers to insist that their tobacco be anthracite-cured. Mr. Applin made the point that while competition is the life-blood of industry, the competition now facing anthracite could be disastrous.

The concrete-block business is big business, Mr. Bloecher declared, in advising owners of cinder banks not to give them away or sell them too cheaply. New pressure-curing methods can produce strong, light-weight blocks in a fraction of the time formerly required. Since 1939, the output of these blocks apparently has quadrupled, Mr. Bloecher said, and if all blocks had been made of cinder aggregate, 20,000,000 tons of the material would have been required for the 1,650,000,000 units made in 1951.

**Continued on p 162**

# Bluefield Show Hits New Peak

NEW RECORDS in attendance and number of exhibitors marked the 1952 Southern Appalachian Industrial Exhibit held May 14-16 at the Norfolk & Western Ry. freight terminal, Bluefield, W. Va. The 3-day exposition, in which some 235 manufacturers and wholesalers participated, was sponsored by the Pocahontas Electrical and Mechanical Institute in cooperation with coal, railroad and other interests.

Attendance for the 3-day period was estimated at 40,000, with women and children visitors held to a minimum under a policy inaugurated this year. A feature of Friday's program was the 1952 reunion of the Pioneer Safety Miners' Club attended by several hundred veteran miners and their families, with Fred Bailey, Cardox Corp., acting as master of ceremonies. As a part of the activities, Joseph A. Holmes Certificates of Achievement were awarded to 61 members of the club.

In the Miner's Gadget Contest, a regular feature of the exhibit, gadgets submitted, in the order ranked by the judges, were:

1. Coal separator of spiral-screen type, by A. W. Herndon, Berwind, W. Va.
2. Mine door, by L. H. Hawkes, Montgomery, W. Va.
3. Safety hook for mine-car coupling pin, by Charles Wilson, Roadfork, W. Va.
4. Counterweighted mine door, by W. M. Hensley, Gary, W. Va.
5. Motor-reversing plug, by A. L. Schaeffer.
6. Dental recorder and counter, by J. D. Smith and W. D. Henry.

**Equipment exhibited at the show included the following:**

**Acme Machinery Co., Williamson, W. Va.**—Acme Model 210 track-mounted and skid-mounted mine air compressors, Schramm Model 420 stationary compressor and the following Le Roi-Cleveland units: stoper jumbo self-propelled, telescopic roof-bolting stopers, reverse-feed sinker, jack hammers and pavement breakers.

**Addressograph - Multigraph Corp.,** Cleveland—Addressograph and Graphotype machines.

**Ahlberg Bearing Co.,** Pittsburgh—Ahlberg and X-Change ball bearings.

**Allis-Chalmers Mfg. Co.,** Milwaukee—Ripl-Flo vibrating screen featuring electrically heated deck, Excitron rectifier tube, dry-type and oil-filled transformers, Type SRL rubber-lined pump, Low-Head vibrating-screen mechanism, AC motor starter and Magic-Grip sheave.

**American Brattice Cloth Co.,** Warsaw, Ind.—ABC brattice cloth and inflated brattice available in various sizes, Mine-Vent tubing, powder bags.

**American Mine Door Co.,** Canton, Ohio—Canton track cleaner, Canton electric track switch, Little Chief high-pressure rock duster.

**American Radiator & Standard Sanitary Co.,** Pittsburgh—Coal-fired Allerton "winter air conditioner" furnace and coal-fired Severn boiler.

**Anaconda Wire & Cable Co.,** New York—Wire and cable for mining.

**Anchor Sales Co.,** Beckley, W. Va.—Alcoa structural shapes and tubing, Victaulic couplings, Greenfield taps and dies, Diamond tools, Roebling wire ropes, Bull Dog friction tape and V-belts.

**Armco Drainage & Metal Products, Inc.,** Middletown, Ohio—Armco tunnel liners, portable-type fan ducts, asbestos-bonded pipe arch, interlocking sheathing, Multi-plate corrugated plate for culverts, Flex-Beam guard rail, Hel-Cor perforated pipe for subdrainage, Steelox buildings and building panels.

**Ashland Oil & Refining Co., Inc.,** Ashland, Ky.—Coal sprays for freeze-proofing and dustproofing, mine lubricants.

**Banks-Miller Supply Co.,** Huntington, W. Va.—Vascaloy-Ramet tungsten-carbide mining tools, Simplex wire and cable, Bethlehem roof bolts and accessories.

**Barber-Greene Co.,** Aurora, Ill.—Belt conveyors, portable and stationary, for underground and top works.

**Barlow Sales & Engineering Co.,** St. Albans, W. Va.—Brad Harrison rubber splicing sleeve, Kuhlman transformer, Electrical Distributors fault finder, Electric Controller & Mfg. Co.'s new mine sectionalizer incorporating an automatic reclosing breaker using the Neo-Timer, Barlow mine distribution box, Barlow Breaker-Tap.

**Barlow & Winsler Co.,** Bluefield, W. Va.—Winkler automatic coal stoker.

**Bashlor-Sowers Welding Supply Service, Inc.,** Bluefield, W. Va.—Linde Oxweld cutting and welding equipment featuring Sigma inert gas welding for ferrous and non-ferrous metals, United Wire silver brazing alloys, Bay State abrasive grinding disks; Hobart welders, electrodes and accessories; Wagner electrode holders and ground clamps.

**Bird & Son, Inc.,** E. Walpole, Mass.—Bird Silvercate reflective-type insulation, insulated siding and Weather-Tex shingles.

**Bituminous Coal Institute,** Washington, D. C.—Varied public-relations activities for the bituminous coal industry, including booklets, films, printed and radio advertising, educational and vocational programs.

**Black & Decker Mfg. Co.,** Towson, Md.—Electric tools, including AC and DC coal drills, "Utility" sets of electric drills and accessories, new 7- and 9-in electric saws, new ¼-in heavy-duty Holgun drill, new Super-Service valve refacer.

**Blackhawk Mfg. Co.,** Milwaukee, Wis.—Porto-Power hydraulic jacks, pipe and conduit benders, knockout punches, Blackhawk torque wrenches and wrench sets.

**Bluefield Hardware Co.,** Bluefield, W. Va.—Carlon EF plastic pipe and new "C" tubing for radiant-heat installations, Aeroquip flexible hose with detachable reusable fittings, National Carbon carbon-and metal-graphite brushes, Goodyear V-belts, including new Compass V Steel belts designed for heavy loads and high speeds, Wood Bigfist coal shovels, Union chains and sprockets and Eveready batteries.

**Bluefield Supply Co.,** Bluefield, W. Va.—Products of the following: Ahlberg Bearing Co., American Radiator & Standard Sanitary Corp., Benjamin Electric Mfg. Co., Bonney Forge & Tool Works, Boston Woven Hose Co., Cincinnati Electric Tool Co., Counts Automotive Supply Co., E. I. du Pont de Nemours & Co., Inc., Farmers Engineering & Mfg. Co., General Electric Co., Gould Pumps, Inc., Greenlee Tool Co., Homestead Valve & Mfg. Co., Ingersoll-Rand Co., Johns-Manville Sales Co., Leich Sales Corp., Link-Belt Co., Lunkenheimer Co., Manning, Maxwell & Moore, Inc., Marion Handle Mills Co., Minnesota Mining & Mfg. Co., Milwaukee Electric Tool Corp., Mosebach Electric & Supply Co., Noble & Stanton, Inc., Penberthy Injector Co., Pennsylvania Rubber Co., Reardon Co., Remington Arms, Inc., Skilsaw, Inc., Smith Welding Equipment Corp., Steel Products Engineering Co., Trumbull Electric Co. Dept. of General Electric, Victaulic Co. of America, West Virginia Steel & Mfg. Co., Daniel Woodhead Co., Yardley Plastics Co. and others.

**Browning Mfg. Co.,** Maysville, Ky.—Browning V-belt drives, rigid and flexible couplings.

**Buchanan Williamson Supply Co.,** Williamson, W. Va.—Vascaloy-Ramet tungsten-carbide mining tools, Simplex wire and cable, Bethlehem roof bolts and accessories.

**Burndy Engineering Co., Inc.,** Norwalk, Conn.—Connectors for electrical conductors featuring Hydent line of terminals and connectors, tooling for Hydent.

**Burroughs Adding Machine Co.,** Detroit—Accounting machines featuring the coal-mine payroll model, micro-filming equipment.

**Calcium Chloride Institute,** Washington, D. C.—Calcium chloride for freeze-proofing and dustproofing coal.

**Ray C. Call Co.,** Charleston, W. Va.—GM 135-hp 90-kw and 275-hp 125-kw diesel-generating units, both in operation furnishing 275-v DC power for the exhibit; GM 3-cylinder diesel engine.

**Carboloy Dept., General Electric Co.,** Schenectady, N. Y.—Carboloy undercutter bits, Carboloy pin-timbering bits, coal-auger bits, finger bits.

**Cardox Corp.,** Chicago—Cardox-Hardoscg Auger Miner driven by a 65-hp engine for drilling holes up to 30 in; Model 87A Airdox compressor.

**Carter Machinery Co.,** Roanoke, Va.—Caterpillar 100-hp D318 and 335-hp D375 diesel engines, Caterpillar D6 trac-

**Continued on p 150**

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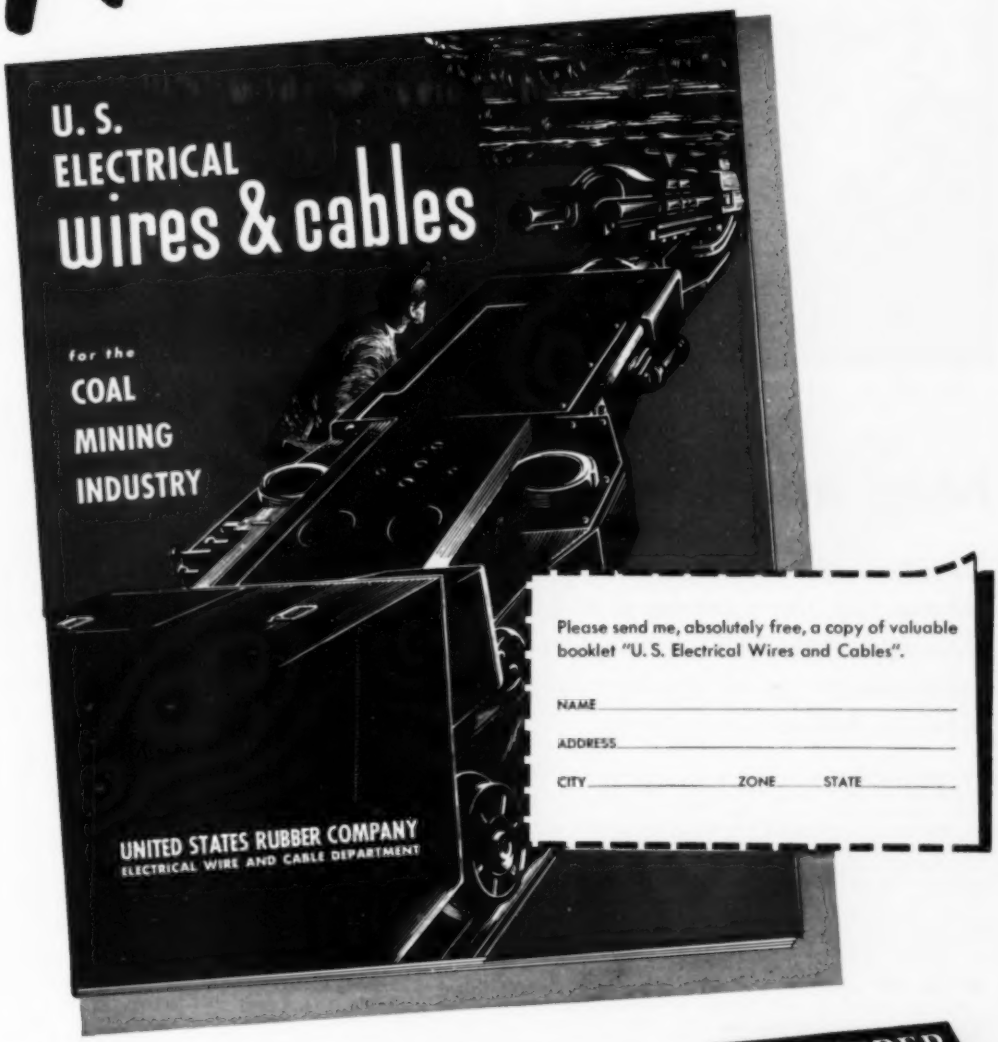


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# Foremen's Forum

**A MACHINE,** no matter how large, is an instrument in a man's hands for doing a job. One of the supervisor's duties is to insure that the man and his machine get along well together for the sake of efficiency.

## Man and Machine Work as a Unit

**For best results in machine mining, you need a qualified man with proper training at the controls of a well-designed machine. Here's how to detect when the man and his machine are out of balance and what you can do to restore the balance.**

AT THE MOMENT a man takes hold of the controls of a machine, that machine becomes a part of the man. It is an instrument in his hands for doing work. How efficiently the work will be done depends upon how well the man and machine will get along together. Isn't it evident that machine design and human engineering must proceed apace if the man-and-machine unit is to operate at maximum efficiency?

### IN THE AIR . . .

As an illustration, let's examine a familiar and famous man-machine unit, the fighter pilot and his ship.

Several years before an airplane is finally ready for testing the designer approaches his drawing board with the mission of conceiving a ship that will fly thus far at such a speed and be highly maneuverable at a certain altitude. The designer can proceed in either of two ways. If he ignores the pilot, he will have in a relatively short time a ship that will fly thus far at such a speed and be highly maneuverable at a certain altitude—but only on paper. Lacking provisions for a pilot, this efficient ship will never leave the ground.

On the other hand, assume that he gives the pilot full consideration from the moment he sits at the drawing board. During his planning, he moves elements of the ship forward and aft and to the left and right to make room for the pilot. He groups dials and indicators on the instrument panel and designs the dials for easy reading so the pilot can see at a glance how his plane is performing. He places controls and switches within easy reach and designs their handles and knobs so the pilot can sense with his hands the control he is operating.

He includes all possible safeguards and safety devices, as further evidence of his consideration for the pilot, then presents for fabrication and testing the epitome of machine design—an efficient package which men can fly.

But perfect as it is, I couldn't fly it.

It takes a sort of superhuman to sit at the controls and do a good job with this machine. Where do you get superhumans? Well, to put it shortly, you make them.

You (meaning the air arms of our military services) select the cream of the crop from among the men who tell you they are interested in flying, then you train these top-notchers to handle your efficient machine. The keywords are "select" and "train."

On the importance of selection, come back if you will to the designer at his drawing board. The chief engineer at the aircraft plant takes me by the arm, we approach the designer and the engineer says, "Design a ship this man can fly." He means me.

Sure enough, in 6 mo the plane is ready and 2 mo later, after intensive training, I fly it. But as a combat plane, it's no good, it isn't efficient. It is so

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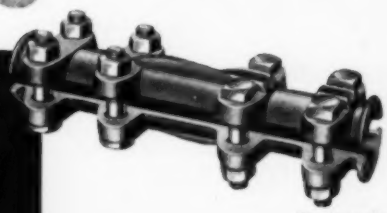

Feeder splicing clamp

## ELRECO FITTINGS

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ALUMINUM FEEDER

Fittings especially designed to accommodate bare aluminum mine feeder are available now!

The complete line of Elreco fittings can be used for bare aluminum up to 1,590,000 CM (equivalent to 1,000,000 CM copper).

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## Make a checklist to help you pin-point unbalancing factors . . .

encumbered with automatic equipment to prevent me from knocking my fool head off that it can't execute a barrel-roll at 5,000 ft, a chore which is not particularly arduous for a hot plane.

### ON THE GROUND . . .

The point is this: It is possible to train almost any man to operate a souped-down version of an efficient machine, but only selected men with certain basic qualifications can be trained to handle the efficient machines. Sound selection should precede training, in any mechanized industry.

But good training is vital, too. Even the selected man requires some upgrading before he can be safely trusted with expensive modern equipment. And here the discussion turns to economics, as it always does when maximum efficiency is the goal.

Maximum economy, hence high efficiency, is achieved when a machine that is not over-designed is operated by a man who is not under-trained. There is some happy medium at which a selected man who is properly trained and a machine that is designed to its optimum "fighting weight" provide a combination that cannot be improved by further training or designing, both expensive.

But this happy medium is a goal yet to be attained. As long as the man-machine unit is plagued by unnecessary injuries to the man or unnecessary breakdowns of the machine, the goal remains in the future.

### . . . AND UNDERGROUND

Up to this point, the discussion has been based upon an illustration from the air age. But the air age is also the coal age, and mining, like the flying services, requires selected men with good training at the controls of well-designed machines. It is vitally important in getting the highest possible efficiency out of mechanical mining methods.

Look at it this way. The operator and his machine are a system which must be kept in balance. If either the man or the machine lags or leads the other, the system is out of balance, and balance should be restored for efficiency's sake.

For example, assume that a well-designed loading machine fresh from the factory is assigned to your mine or section. If you appoint as operator of this machine a man with no desire to handle it and with no training, your section won't load much coal. So, what do you do?

Well, you have two avenues of approach to the solution of the problem—through the machine or through the man.

You may condemn the machine as not being adapted to the work, and it might be returned to the factory for changes. So a lot more money is poured into further development of the unit. Then one day it is returned to you, you put it to work with the same operator, but it doesn't load any more coal. All that money for further development has been wasted.

On the other hand, as you face the original problem you may decide to do something about the man. If he has no interest in the machine, you suggest his transfer to other work and you select an alert, dexterous fellow who really likes to put machines through their paces. Then you train him as well as you can. Lo, your section produces at a respectable rate. And you haven't consumed as much money and time as when you tried to tailor the machine to the disinterested operator's ability.

We have weighted this example in favor of the machine merely to show how a system may be out of balance. However, there are all degrees of unbalance, thus giving the foreman the additional responsibility of detecting these imperfections and taking the inital steps to correct them.

### HOW TO DETECT AN UNBALANCED UNIT

An out-of-balance system generally displays one or more of three characteristic signals, as follows:

1. **Low Productivity**—Since there is no absolute ceiling on productivity, you will have to gage the performance of the unit you are considering against some arbitrary standard. The best arbitrary standard is the average production of some of the better units which operate under similar conditions. If your unit is very far off this average, you can suspect lack of balance.

2. **Frequent Injuries**—If the operators of similar machines suffer more or less frequent injuries, review the circumstances surrounding the accidents and you may find they hold to a pattern. If you see any pattern whatever, you'll know you have an unbalanced unit.

3. **Frequent Breakdowns**—like injuries, frequent machine breakdowns may also follow a pattern. Keep notes on outages and review them at frequent intervals. If the same part breaks three times in one week, you have been warned to think about the operator and the machine.

These are the danger signals. When you see the signals, how do you go about pin-pointing the cause of the unbalanced condition?

Perhaps your best aid in finding the hidden cause will be a checklist, which by the process of elimination will help you isolate the offending factor.

Consider the man. Does he want to run the machine? Is he trained to the limit of your company's training ability? Is he physically able to handle the job?

Consider the machine. Is it in good condition? Does it get the proper voltage? Are there any makeshift repairs on it? Does it get the recommended lubrication? The longer you make these checklists, the better you will be able to pin-point the unbalancing factor.

Having the checklists, how do you use them?

Both man and machine contribute to the over-all efficiency of the unit, but they contribute individually so study them individually. Be honest as you go down the checklists and check off each item that might cause the man or the machine to do less than his or its best.

Now analyze the checklist, and this is where you put to good use the outstanding supervisor's hallmark, clear judgment. Weigh the unbalancing factors against each other and thoughtfully decide which ones are giving you the most trouble.

### HOW TO CORRECT AN UNBALANCED UNIT

Both man and machine contribute to over-all efficiency, as mentioned, but they often contribute unequally. For the greatest return from your correction effort, devote most of your thought to the low contributor. If you have a machine of 90% efficiency operated by a man of 60% efficiency, you can break your back trying to raise the machine's efficiency to 92% but even if you succeed you won't get much gain in over-all efficiency. However, some additional training for the man may soon have him 70% efficient, and the gain in over-all efficiency will stand out. And vice versa, if you have a good operator on a substandard machine, give your thought to improving the machine. To repeat, give most of your thought to the less efficient component of the system, either the man or the machine. By doing so, you get big gains much easier and much faster.

When you finally get the system back into balance, you will find that its output approaches the average of the better units operating under similar conditions. Then you can continue your efforts to make further gains with a better chance for success, because you are starting with a balanced system.

### THE MACHINE IS PART OF THE MAN

At the beginning of this discussion, we pointed out that the machine becomes part of the man, not the other way 'round. If the man is thought of as part of the machine, the system again becomes unbalanced. Remember, the machine has no pride, but the man has.

## How to Lose Friends and Antagonize People; or *Six easy steps to a new job—in another business.*

1. When the chairman of the mine committee raises a gripe, tell him he's nuts.

2. When the machine operator tells you he has run into some hard cutting, tell him you have no time for excuses.

3. Never say "Good Morning."

4. About three times a week, let your cross-shifter know you're going to "fix his clock."

5. When the "Super" tells you your tonnage is dropping, tell him to get off your back and stop picking on you.

6. The day you're fired, tell the boys at the poolroom you never liked the job anyway.

# Practical Assistance

Whether it's getting out of a fishing tackle tangle, or unsnarling a *lubrication snag* in your mining operation... practical assistance, the kind that gets you off the hook fast, is the thing you look for most.

And ***PRACTICAL TECHNICAL ASSISTANCE*** is a Cities Service specialty.

Cities Service Lubrication Engineers can offer every mining operation practical assistance that will mean dollars, man-hours and equipment saved. These specialists in the industry's most effective lubricating practices, offer the most complete line of quality lubricants.

## *but check for yourself:*

✔ Check on the high quality of all Cities Service lubricants. Ask critical users, or better still, test them on the job.

✔ Check the *complete* Cities Service line for the correct lubricant for every need. Deliveries are quick, accurate and dependable.

✔ And finally, discuss your problems with a Cities Service Lubrication Engineer... he's probably solved many like them for other mining operations. Write or phone CITIES SERVICE OIL COMPANY, Dept. F9, Sixty Wall Tower, New York City 5 . . . or get in touch with the office nearest you.

**CITIES SERVICE**

# Operating Ideas

**NEWLY-DEVELOPED ELECTRIC IMPACT TOOL** cuts repair time on large stripping units by running rusted or dirt-encrusted nuts or studs in a matter of seconds. Cutting repair time increases payload time, thus getting more service out of equipment that represents a sizable investment.

## Cutting Repair Time on Heavy Stripping Units

"WITH OUR SIZABLE INVESTMENT in equipment we can't afford to let it stand idle in the shop. By reducing repair time, electric impact wrenches help us get better service from all the units we operate," says Pat Fauzio, superintendent, Greenwood stripping, Fauzio Bros., Nesquehoning, Pa., in describing how repetitive nut-running jobs have been speeded up at Greenwood by Ingersoll-Rand Impactools, Models 34-U and 8-U.

The company employs 450 men and operates the Greenwood, Forty-Foot and Mammoth strippings in the Lansford-Nesquehoning area. Equipment includes 100 trucks, 12 tractors and 27 shovels, which would represent a staggering amount of work for mechanics with hand wrenches. But the Impactools, which can loosen or tighten nuts or studs in a matter of seconds, get the machines back into service much faster and keep them working longer.

The 34-U has a 1-in square drive and is rated for work up to 1¼-in bolt size. At Greenwood it is used mainly for work on truck-spring U-bolts, wheel bolts, shovel booms and shaft pinions, and for removing and running jam nuts. The 8-U, a smaller tool, is designed for use up to

**ALL 148 BOLTS** which secure the pads to a crawler track can be removed or replaced with smaller electric wrench in about half the time required for doing the job with a hand wrench.

⅝-in bolt size. The 8-U is especially useful when it becomes necessary to change pads on tractor crawler treads. The track pads are tightened before a new tractor goes to work, retightened every 5 or 6 mo and replaced every year.

Furthermore, all new units are run through the shop before going to the job, and the Impactools speed the job of giving each nut and stud on these units a tightness check. The pay-off is in long, trouble-free service on the job.

## Machine Bit for Severe Conditions

Recently-developed Kennametal UR Bits feature a thick narrow cutting edge to offer great resistance to impact, and meet more severe conditions. While originally designed for continuous mining machines, it has since been adapted with equal success for service in conventional chain machines. Tip thicknesses employed are ¾", ¼", and ⅝" depending on conditions. Kennametal Catalog Supplement B-73 gives full particulars.

●

## New Roof Drill Bit Has Angled Slot

An improved feature of Kennametal Roof Bits, particularly for drilling hard materials such as laminated sandstone and other similar materials, is a slot recessed in the center of the insert at an angle of 30 degrees. This feature strengthens the cutting edges as backing is thus increased from 90 to 120 degrees. Operators have stated that it drills straighter, faster, lasts longer in hard materials.

●

## Web Core Breakers in Coal Drill Bits

A special feature of Kennametal Drill Bits in larger sizes is a web core breaker. It is incorporated into the body design and extends from the center of the bit to the base of the cutting edge. Being offset it breaks up solids that may be formed between the prongs through both pressure and impact exerted on them by the core breaker while drilling. The web core breaker may be noted on the drill bit illustrated.

●

## Dale Christopher to Represent Kennametal in Northern W. Va.

Dale Christopher has been recently named as representative for Kennametal tools in Northern West Virginia. Mr. Christopher has been associated with the coal industry in one capacity or another for the past twenty years. His beginning with the Consolidation Coal Company of Kentucky has since led through various supervising positions, both in the mines and in the sale of coal mine equipment.

*(Advertisement)*


# KENNAMETAL BIT...

drills long footage fast and easy... for 2 5/16" diameter tubes

KENNAMETAL
1⅜" and 1¼" hexagonal shanks permit large size Kennametal Bits to be used either with Kennametal augers or with augers of other makes.
Proper cutting edge, rake, and clearance angles together with non-tracking lead edges enable fast rates of penetration to be obtained.
Solid tips of Kennametal tungsten-carbide offer proper combination of shock and wear-resistance to provide maximum service life.

The rigid design of Kennametal Drill Bits enables them to give minimum bit cost and fast rates of penetration for drilling large diameter blast holes — especially for 2 5/16" diameter tubes and for conditions requiring large mounted drills. Many thousand feet are obtained with Kennametal Bits while operating under excessive pressures in seams that contain many impurities.

The low cost of Kennametal Bit service is partly explained by husky body design and proper heat treatment, but more important is the superior shock and wear-resistant qualities of the Kennametal tip. In this important respect, no other tungsten-carbide in the coal industry can equal it.

For more particulars, inquire from your local Kennametal representative today! Kennametal Inc., Latrobe, Pa.

# KENNAMETAL®

**Quality Carbide Of The Coal Industry**

*World's Largest Manufacturer of Tungsten-Carbide Mining Tools*

# Two Ideas for Better Oil Treatment of Coal . . .

## . . . Use Ultra-Violet Light to Check Proper Oil Coverage

TESTS of several treated coals have indicated that use of an ultra-violet light is a good means of analyzing oil coverage and "I have had very good results in controlling our oil treatment by this method," writes Herman E. Knight, engineer of mines, R.F.D. 5, Madisonville, Ky.

Ultra-violet light striking coal-spray oil causes the oil to "glow" or fluoresce. Various substances fluoresce with distinct characteristic colors. Oil used for treatment of coal fluoresces a yellow or golden color. Natural coal, not oiled, will not glow or fluoresce with ultra-violet light. These properties may be used to determine proper coverage of oil in treated coals.

It is well known that all minerals are made up of atoms and that each atom is composed of smaller particles, such as protons, electrons, neutrons, positrons, etc. The electrons are said to revolve around the nucleus of the atom in a planetary manner, and the simplified theory of fluorescence is that the ultra-violet energy which strikes the atom in the form of photons is absorbed in the electron, causing it to change its orbit around the nucleus. Once it has changed its orbit, it proceeds to lose a small amount of energy in the form of heat as it returns to its original orbit. The wave length of this re-radiated light determines the color of the fluorescence. This phenomenon causes coal-spray oil to glow a yellow color.

At present, meters are used to gage the quantity of oil sprayed on coal. Metering of oil is not enough since, in addition to enough oil, there must be proper coverage of each lump of coal. A perfectly treated coal would be one that contained a thin protective film of oil over each lump of the coal. This requirement is often exceedingly difficult to meet without using a prohibitive amount of oil.

The oil coverage of coal by visual inspection is made even more difficult by some coal being wet when treated with oil. The determination of good oil coverage on wet coal is a difficult task.

Natural coal does not fluoresce with ultra-violet light, but is colored the inherent violet color of the light. In testing for proper coverage, a sample of coal may be taken from a chute, conveyor or car after being oil treated and then tested in a semidark or dark place with ultra-violet light. Coal which has been insufficiently treated will contain violet or purple spots, while the oil treated will glow the yellow color. Excess oil will be indicated by yellow blotches on the sides of the container or stringy yellow oil between the individual lumps. The pressure on the nozzles or the orifice diameter may be changed to ultimately give complete coverage without waste.

The ultra-violet unit may be used with 110-v current, or with B-type batteries. "The source of ultra-violet light I have used," Mr. Knight says, is a "Mineralight" manufactured by Ultra-Violet Products, Inc., 145 Pasadena Ave., S. Pasadena, Calif.

Inspection of railroad cars of treated coal may be made with an ultra-violet light equipped with batteries. Such inspections must be made at night. Properly treated cars will glow a solid yellow color when the light is carried over the car of coal.

## . . . Make Adjustments for Varying Temperatures

PROPERLY PREPARED OIL-TREATED DOMESTIC COALS are accepted as premium quality fuels. Yet, failure to adjust mechanical treating systems to changes in atmospheric temperature occasionally results in customer complaints, points out the Ashland Oil & Refining Co., Ashland, Ky., in this discussion of the problem published in a recent "Coal Spray Bulletin."

Dustiness is one of the specific conditions causing complaints. This results from under-treatment and is readily apparent to the coal dealer and his customer. The coal dealer who is equipped with a portable oil treating system can correct this condition by respraying the coal in his yard.

Over-treatment, however, is a condition that cannot be corrected by the dealer. There are blotches or streaks of oil on the coal. It stains the floor of the customer's bin or leaves a film of oil on the water around the stockpiles. The consumer may complain about oil odor, about extra soot on the furnace door or about oily smoke thrown out by the backdraft and from the chimney.

These complaints can be eliminated by adequate control of the oil applied to each car of coal shipped. The old method of calibrating the quantity of oil applied by the size of the nozzle used or by averaging out the coal-oil ratio on a monthly basis does not result in uniform oil treatment. The efficiency of a treating plant cannot be measured in terms of oil used per ton of coal on a shift, a day, or a month. The true efficiency of the plant is measured by its production of uniformly treated coal, satisfied customers and economical use of oil to treat the coal for its specific end use. Unless variable temperature conditions are noted and the required adjustments made in the preparation equipment, improper treatment is sure to occur.

The viscosity or thickness of coal-spray oil varies with temperature. The preparation engineer's problem is to make the adjustments necessary to his oil-treating equipment to maintain uniform application of the oil to the coal under any and all climatic conditions.

The following table illustrates the temperatures necessary to reduce the viscosity of oils of various consistencies to a uniform viscosity of 100 sec at 100 F:

S.S.U. VISCOSITY OF OIL AT 100 F

| Vis. Coal Spray | If Preheated to Deg F | Becomes Viscosity |
|---|---|---|
| 100 | 100 | 100 |
| 200 | 135 | 100 |
| 300 | 145 | 100 |
| 400 | 160 | 100 |
| 500 | 170 | 100 |
| 600 | 180 | 100 |
| 800 | 190 | 100 |
| 1,000 | 200 | 100 |
| 1,500 | 210 | 100 |
| 2,000 | 225 | 100 |
| 2,500 | 235 | 100 |
| 3,000 | 240 | 100 |

In hot-oil systems, the thermostat on the oil heater should be set to "kick off" at the predetermined temperature shown in the above chart to make a 100 viscosity oil out of the spray oil being used. The automatic thermostat control assures a constant flow of oil at that temperature. High-pressure cold-oil systems do an equally good job of treating as long as a uniform pressure is held at the nozzle. Adjusting pump pressures will compensate for variations in oil temperatures.

Atmospheric temperature changes affect the fluidity of coal-spray oil so quickly that lack of automatic controls or failure to make the proper adjustments in the treating equipment as required will result in unsatisfactory or incomplete treatment. A pressure gage, a relief valve and a line thermometer at the farthest treating point in the preparation plant will enable the foreman to make more accurate adjustments to meet variable weather conditions. By installing a flowmeter for each loading boom, an accurate account can be kept of the quantity of oil applied to each car of coal loaded. It takes proper oil-treating equipment and skilled alert workmen to be sure of uniform, correct oil treating to prevent all causes of complaints and waste of oil.


### *Spare Cash?*

**WE CAN'T MAKE YOU RICH, but we would like a chance to pay you for the privilege of printing your own successful "Operating Idea." You'll find it no trouble if you follow the suggestions given on p 121.**

# Get Full Bolt Strength

## WITH O-B EXPANSION SHELLS AND PLUGS

Here are some important things for any roof-bolting property to remember:

In mines where roof bolting has proved practical, O-B Shells and Plugs, properly installed in right-size holes, can develop the full tensile strength of a ¾-inch bolt.

For ease in handling, O-B Shells and Plugs are shipped to the mine assembled, with shells pre-expanded, ready to be turned onto the bolt.

Prongs of the O-B Shell make contact with the hole wall even before the bolt is tightened. This is important, for it is your assurance that the bolt will draw up when the tightening force is applied to the bolt head.

If you are bolting, or planning to bolt to get good roof, you can rely on O-B Roof Support Expansion Shells and Plugs for speed in your bolting cycle and strength in your bolt installations. Get complete information from your O-B representative, or write to Ohio Brass Company for roof bolting information.

Turn O-B Shells and Plugs onto roof bolts as shown in the two steps here. First, the shell and plug assembly is run onto the bolt for three or four turns. Then drop shell down onto its support of upset ears or palnut. Adjust plug so that line marked "Top of Shell" is even with top of shell prong. Bolt is now ready for installation.

**Ohio Brass**

MANSFIELD (B) OHIO, U. S. A.

IN CANADA: CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.

HAULAGE WAYS *Jr.*

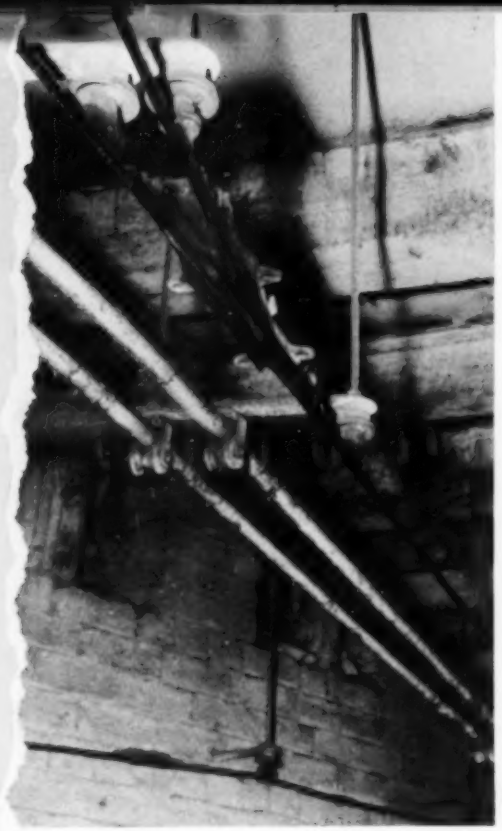
# Firm Contacts Keep O-B Taps *Cool*

Especially firm contacts between current-carrying parts in O-B Fused Taps prevent destructive heating, and give longer life to tap fuses as well as to tap parts. Spring-type and clamp-type contacts grip trolley wire or feeder cable, and six sturdy springs in each fuse receptacle bear tightly on the fuse ferrules. Or, if stud-type fuses are used, carefully tapped holes in the fuse receptacles make a close fit – and intimate contact – with the fuse stud.

Overheating causes frequent fuse blow-outs, and promotes oxidation of current-carrying parts. Thus the tight contacts in O-B Fused Taps let you get longer service from your fuses, and from the fused taps as well, by holding heat generation to a minimum.

Let an O-B Fused Tap at the end of every trailing cable show you the way to longer fuse life, longer tap life, and better protection for your trailing cables!

Three O-B Tap Contacts shown here use springs or mechanical clamping pressure to maintain firm grips on the trolley wire or feeder cable. Wide jaws, tightly clamped to the conductor, permit current transfer without excessive heating.



This picture was taken after five years and four months of continuous service for the Type-M Frog shown. During that time it guided more than 180,000 collector passes. Hard use is evident, but there is a good amount of service still available from the fitting.

Haulage past this O-B Type-T Section Insulator switch averages about 2,500 tons daily, yet there is no evidence of wire-burning and wear. Periodic wire conditioning at this mine also helps to keep the trolley wire free of pits and lumps.

# O-B Trolley Fittings

# RESIST WEAR

## in Hardest Use

In main haul overhead, O-B Trolley Materials pass the hardest use test easily -- and you may be sure they'll do as well or better at any other spot in your haulage system. Good examples are the O-B Section Insulator Switch or the O-B Frog shown here, which have guided the most, the heaviest, and the fastest traffic in their respective haulage systems for months on end. The condition of the switch and frog is typical of the wear resistance which all O-B Smooth Underrun Trolley Materials show to hard haulage service.

*Smooth Underrun* is the important clue to longer life for O-B trolley fittings, as well as for the adjacent trolley wire. Current collectors pass O-B section insulators, frogs, wire clamps or section insulator switches without bouncing; thus there is no destructive arcing or wire-burning to cause wear on the fitting or wire.

Get this same smooth path for your locomotive current collectors with O-B Smooth Underrun Trolley Materials, and profit from longer life for your trolley fittings and trolley wire -- as well as from better collector performance.

Ohio Brass

MANSFIELD OHIO, U. S. A.

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HAULAGE WAYS *Jr.*

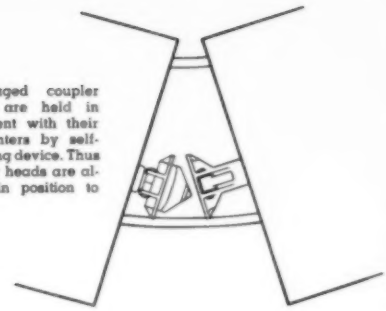
# After Hardest Use, O-B Couplers Snap back for More

Even after the severest sort of mauling, O-B Couplers snap back into position, ready to join again, ready to absorb more punishment. Mine car couplers take a real licking in hard haulage service, and it's certainly an advantage to know that O-B Automatic Mine Car Couplers will stand up to the roughest treatment – not just for weeks or months – but for years!

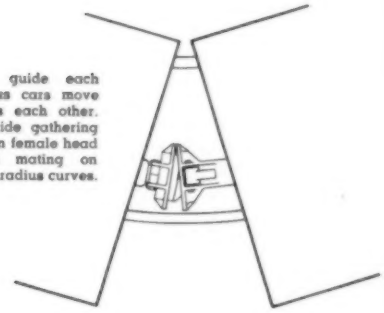
Both mine car and coupler are protected by the compression of tough, durable rubber draft gear in the O-B Coupler, which absorbs the beatings of regular haulage service. Self-centering, rubber cushioned O-B Couplers always snap back to center when released – thus mating heads guide one another and join, while with ordinary couplers there's always the chance that mating heads will deflect and do damage to one another, as well as to the cars.

Rubber draft gear and self-centering mechanisms in O-B Couplers give important protection for both coupler and car. Put these protective features to work for you, by ordering O-B Couplers when you replace or remodel cars for your haulage system.

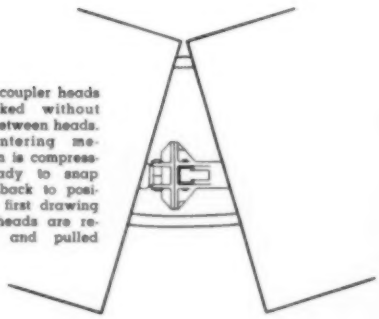
Self-centering keeps heads ready in position to join and interlock without guidance.



Unengaged coupler heads are held in alignment with their car centers by self-centering device. Thus coupler heads are always in position to join.



Heads guide each other as cars move towards each other. Extra-wide gathering range in female head assures mating on normal radius curves.



Joined coupler heads interlocked without slack between heads. Self-centering mechanism is compressed, ready to snap heads back to position of first drawing when heads are released and pulled apart.

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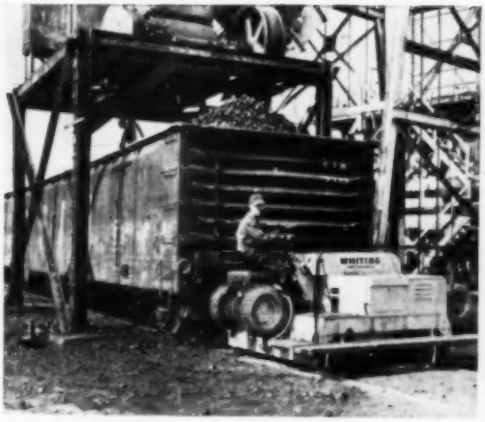


Operating on rails or . . .

on roadway, dual-purpose unit . . .

## Speeds Peabody Car Handling

WORTHWHILE SAVINGS in time and manpower have been reported with the use of two Whiting Trackmobiles for railroad-car moving, spotting and switching at the new Mine No. 10 of the Peabody Coal Co., Pawnee, Ill. Equally useful on- or off-track, the Trackmobiles can be changed over from road to track, or vice versa, in 30 sec.

While primary service has been for spotting empties and moving loaded cars, the units have been performing other car-moving, spotting and switching jobs incidental to mine construction and operation. Their operation reportedly eliminated the expense of grading to create a hump at the temporary tipple as well as the need for mechanical car pullers.

For car loading, the Trackmobile first spots empties on tracks leading to the loading zone. It usually moves three cars to the loading hopper at one time, placing the first directly under the hopper. It pulls two of the cars gradually along until they are filled and spots the third car under the hopper where it is uncoupled. It then moves the loaded cars up a ½% grade out from the yards. At an improved crossing en route, the Trackmobile is stopped and uncoupled from the front of the cars, moving on its road wheels to the rear of the cars where it returns to the track to push them to the siding. When the loaded cars have been properly placed, it returns to the third car left in the loading zone.

## Shop Tools Help Salvage Tractor Bellows Seals

FIVE SIMPLE TOOLS, quickly and easily made from inexpensive materials found in most service shops, are aiding in the salvage and reconditioning of final-drive bellows seals in track-type tractors, thus helping to extend the currently critical supply of copper and tin. The repair materials are readily available, the required tools can be easily fabricated in any shop and the technique is not difficult, according to the Caterpillar Tractor Co., Peoria, Ill., which now is carrying on a program for conservation of these seals as part of a large-scale, long-range field repair and conservation effort.

The tools used include: a T-handle for removing bellows seals; a shaping tool or "dolly" with shaping pliers used to "iron out" corrugations, making them smooth and uniform in size; a seal spreader for expanding the seal and exposing the breaks to make them accessible for repairs; and a crowfoot punch for bringing the retaining rings back to shape on a flat steel plate.

In the past it has been common practice to replace all worn or damaged final-drive bellows seals with new parts, rather than attempt their repair. Many bellows are made useless because of serious damage during removal. Accumulations of mud and dirt, plus the adhesive strength of the cement used in assembling the seal gaskets, also make removal difficult.

However, by careful removal and the relatively easy process of replacing the cork-leather gasket and cork facing, about 50% of all bellows seals can be returned to immediate service, Caterpillar says. Many other seals which have been damaged during operation or removal can be successfully repaired by soldering patches of thin brass (salvaged from seals damaged beyond repair) over the fractured area.

### It's No Trick at All!

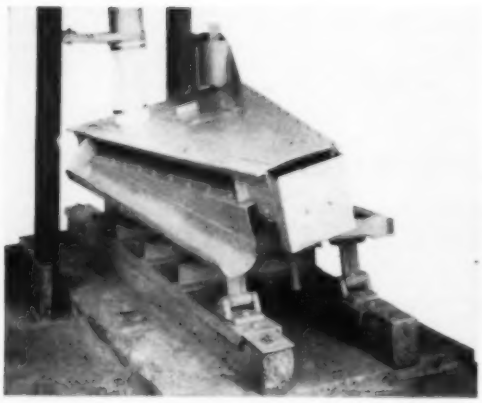
**THERE'S NOTHING MYSTERIOUS involved in getting your own "Operating Idea" published in COAL AGE. We're glad to have them and will welcome the chance to pay you $10 or more for each acceptable idea, on publication. It can be a mining "wrinkle," an electrical, safety, maintenance or preparation idea—it makes no difference as long as it successfully helps to do a mining job better. And you don't have to be a writer or an engineer. Just tell us in a letter in your own words how your idea works and what it does. Send a rough sketch or photo if you can, and we'll do the rest. Write: The Editor, COAL AGE, 330 W. 42 St., New York 36.**

# Equipment News

## Compact Blasting Unit Fires Up to 10 Shots (1)

New MSA permissible multiple-shot blasting unit (USBM Approval 1608), said by the maker to incorporate improved firing action and safety and dependability in a compact and lightweight assembly, fires up to 10 shots simultaneously. It weighs 1 lb, measures 2⅝ x 2¾ x 4¾ in and is carried on the belt by a snap-on clip. There is no danger of accidental firing, the designers point out, as the wiring circuit is completely insulated from the battery container and, since the unit is capacitor-operated, the full charge is dissipated with each shot, thus eliminating misfires. The top of the battery container and the push-button lead retainers also are insulated and the dry-cell batteries are housed in a moisture-resistant case. Full details in Bulletin 0901-1 from *Mine Safety Appliances Co., Pittsburgh 8.*

**WANT MORE DETAILS? The postage-free card facing p 128 will bring you manufacturers' bulletins or other information on any item in this Equipment News section, without obligation. Just circle the numbers, sign card and mail.**



## Concentrator for Dry-Cleaning Coal (2)

The Cottrell pneumatic dry concentrator, designed for handling various feeds, has proven particularly suitable for dry-cleaning of coal, the manufacturer reports. In tests cited by the maker, ash content of a Tennessee coal was reduced from 37% to 8% in one run, with a material reduction in sulphur content, while on another coal, a 21% ash content was reduced to 4½%. The units are made in three sizes, with coal capacities of 3½ to 14 tph. The machine is dustless in operation since the exhauster collects all dust from the table and passes it to the dust collector for disposal. The riffle board consists of a grooved sheet of galvanized steel with perforations to admit air from the blower, which keeps material being treated in partial suspension. The reciprocating motion, partial suspension of feed and action of the riffles combine to permit a very fine separation, it is said. The entire unit is built to require a minimum of attention during operation and has forced lubrication system. Details from *Cottrell Engineering Co., Los Angeles 31.*

## Longer Reach for 2½-Yd Shovel (3)

The recently introduced Koehring Hi-Lift stripping shovel, using both 2- and 2½-yd dippers according to digging conditions, has a maximum dumping height of 40 ft and a reach of 60 ft, with a boom angle of 45 deg. Using the same base machine as the standard 2½-yd Model 1005, the Hi-Lift stripper operates with a 50-ft boom and a 36-ft dipper stick. Features of the new design cited by the maker include a single dipper stick with cable crowd, a twin-box-section boom structure for maximum strength and minimum weight and unusually large sheaves to prolong cable life. In addition, the unit can be converted for lift-crane, dragline or clamshell operation. The standard 60-ft crane boom can be increased to a maximum of 150 ft, including a 30-ft boom jib, and will handle 2½- to 4-yd dragline buckets or 3- to 4-yd clamshell buckets. Full details from *Koehring Co., Milwaukee 16, Wis.*

## Rear-Dump Unit Is Diesel-Powered (4)

Latest addition to the LaPlante-Choate line is the TR200 motor wagon, a hydraulically operated rear-dump wagon powered by a T200 2-wheeled rubber-tired tractor available with a

## Angular Slotted Bits Drill Longer in Hard Roof

An angular slotted recess in the cutting edge of Kennametal Roof Drill Bits is a new design feature that greatly increases bit life, particularly in hard roof. It also reduces bit "wander". Operators have reported as much as 30 per cent longer footage in laminated sandstone with bits of the new design.

●

## "First Aid" to Ailing Drill

Whenever you have trouble with drilling or cutting, "just call your Kennametal representative." He's an expert on these matters—and must be. He devotes all his time to them, and is a veteran coal mining man to boot. When one operator in Central West Virginia had a few armatures burn out, he called Jason C. McGuire, our local representative. After giving conditions the once-over, it was obvious that the bits were not being properly reconditioned. They were losing gage, and not allowing sufficient clearance for the auger. The problem was solved in a short time by giving the bit grinding man the proper instructions for the particular drilling conditions that were being encountered down at the face. It was a small, but important matter. But frequently little changes can make an appreciable difference in operating cost. Always depend on your local Kennametal representative for matters like this. He's glad to be of service.

●

## Hexagonal Shank Bits for Drilling Holes for 2-5/16" Diameter Tubes

Kennametal Hexagonal Shanks in sizes of ⅞" and 1⅛" provide strong bit construction for drilling larger diameter blast holes. They also enable the bits to withstand heavier pressure when they are being used on large drills for drilling hard impurities.

●

## Jack W. Begley is New Kennametal Representative

Jack W. Begley has been recently appointed Kennametal sales representative for southern West Virginia, western Virginia, and eastern Tennessee. Mr. Begley has worked in and around coal mines since the age of 16 and he takes over this assignment 1½ years after being graduated in mining engineering from the University of Kentucky.

(Advertisement)


*Only*

**KENNAMETAL**

*offers you . . .*

- **LONGER LASTING CARBIDE**
- **SUPERIOR BIT DESIGN AND CONSTRUCTION**
- **EFFICIENT FIELD SERVICE**

*to Give You Better All-Around Bit Performance . . .*

Kennametal Carbide, bit design, and field service are a proved combination of features, offered only by Kennametal, that assure lowest coal cutting cost, at highest efficiency.

Kennametal Carbide possesses greater uniformity of grain structure which gives it maximum resistance to impact and wear. Evidence of this fact is that 95 per cent of the cutting and drilling in hard potash ore deposits is done with Kennametal. This is as severe a test of the stamina of a bit as exists. The design and construction of the Kennametal Bit itself is no less important. The bit body is a special alloy steel that is heat-treated and hardened to the extent that it has the highest strength obtainable in a 1"x ½" steel section. A shoulder on the bit gives the cutting edge extra support, and prevents the bit from freezing in the block. In addition, Kennametal Bits are offered in more than 30 different types of cutting edge construction. This affords opportunity to have a design best suited to your needs—cost, job, equipment considered.

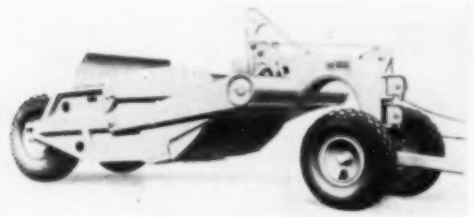
These outstanding features of Kennametal are supplemented by competent Kennametal field representatives, veteran coal mining men, who are always available for demonstration or for service on any trouble that may develop. They give you the best, and they know carbide bits — inside out. Kennametal Inc., Latrobe, Pa.

**KENNAMETAL®**

**Quality Carbide Of The Coal Industry**

*World's Largest Manufacturer of Tungsten-Carbide Mining Tools*

choice of diesel engines, including the Cummins 165-hp and Buda 176-hp 6-cylinder engines. The tractor is the same as used with the TS200 motor scraper, and scraper and wagon units are interchangeable since they use the same hydraulic system. Features cited by the company include 4-wheel air brakes making it possible to back over the edge of a fill with complete safety; an obstruction-free body interior plus a 70-deg tilting angle assuring complete and easy discharge of all types of material; shock-absorbing body construction; and an all-steel cab for operator protection. Top speed is 22 mph. Full details from *LaPlante-Choate Mfg. Co., Cedar Rapids, Iowa.*



## Scraper Handles Up to 11½ Yd (5)

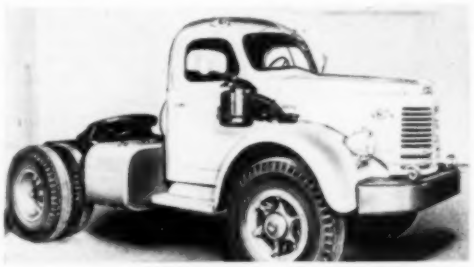
New Caterpillar No. 60 scraper designed for use with the D6 tractor features a flat-bottom bowl and stringer blade engineered for loading and finishing characteristics. The reversible blade cuts a swath 7 ft 8 in and the bottom is double with steel-bean fillers. Capacity of the unit has been increased to 7 cu yd struck, and 9 yd heaped, with sideboards available to boost capacity to 8.3 and 11.5 yd, respectively. Maximum carrying capacity is 11.5 tons. Other features cited by the maker include an unobstructed bowl, tapered roller bearings at the axles, induction-hardened sheaves, bulldozer-type ejection and operation by a Caterpillar cable control available for attachment to the tractor. More information from *Caterpillar Tractor Co., Peoria 8, Ill.*

## Buckets Skid Loads on Ground (6)

New line of Drott Skid-Shovels, built exclusively for International TD-9, TD-14A and TD-18A tractors, with capacities of 1¾, 2 and 3 yd, respectively, transport loads with shoes skidding on the ground. Shoe transportation eliminates "carry strain" other front-end loaders must bear, provides excellent operator visibility and maintains perfect balance even over the roughest terrain, the maker says. A patented featured called "Break-Out Action" gives the bucket a crowding action at every bite, assuring a heaped load, and the bucket is rolled back as much as 28 in before the load is lifted without spillage, it is said. Low over-all clearance permits work in confined areas and all hydraulics are fully enclosed and protected, with rear end free for mounting auxiliary equipment. Data from *Drott Mfg. Corp., Milwaukee 12, Wis.*

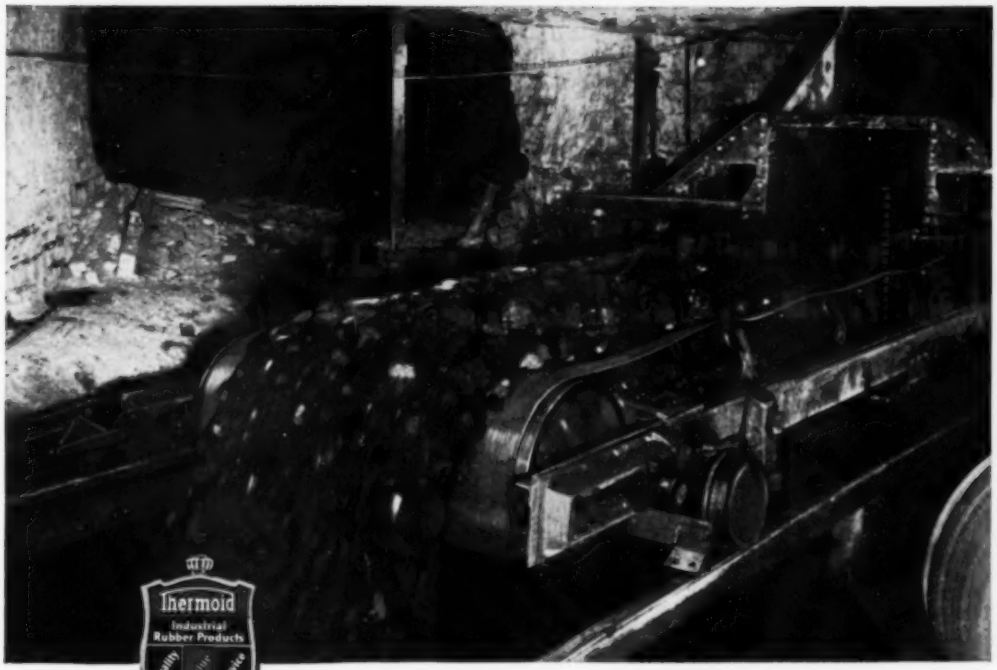
## Unit Cuts 1¾-in Wire Rope in 7 Sec (7)

New Series 15 Guillotine latch-type wire-rope cutter exerts up to 50-tons thrust to make a clean cut through wire rope up to 1¾ in in as little as 7 sec, the maker says. It is simple to operate and weighs only 75 lb, using heavy-duty shear-type blades that are easily removed for sharpening when needed. The Series 15 basic cutting unit is available with a variety of electric- and air-hydraulic pump assemblies, including foot-lever and remote-control units. More data from *Manco Mfg. Co., Bradley, Ill.*



## Diesel Truck Stresses Light Weight (8)

Reo Motors, Inc., which only recently announced production of LPG-powered trucks, has entered the diesel field with a new Model F-23DT high-speed truck-tractor powered by the new lightweight 150-hp Cummins JBS-600 diesel engine. Combination of the new high-compression engine and the specially designed Reo chassis to make it one of the lightest units in its class provides operators with important weight advantages, the company says. The F23DT has a gross tractor rating of 50,000 lb and a 130-in wheelbase and will be followed by other models as the supply of engines becomes more plentiful. The unit features the Reo "More-Load" design, with its short wheel base reducing turning radius to only a few inches over 21 ft, and also incorporates a new Timken QT-300 2-speed double-reduction axle designed for highway operation.—*Reo Motors, Inc., Lansing 20, Mich.*




# Nothing too rough or tough for Thermoid Conveyor Belting

Thermoid's long experience and continuing research *in the field*, pays off with real economy, maximum efficiency and greater tonnage for your belting dollar. Regardless of the size or kind of material—light or heavy, soft or abrasive, hot or cold, wet or dry—whatever the job, it's a good bet that Thermoid has solved the same or a similar problem with a belt that will do the job better.

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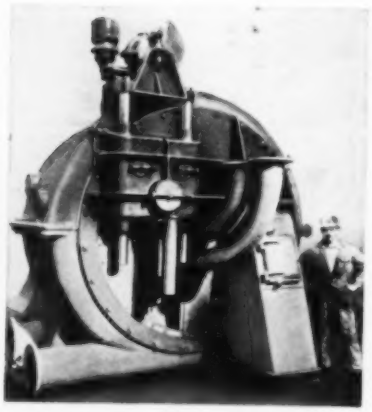
## EQUIPMENT NEWS—For more information, use the card facing p 128.



### Dutch Centrifuges Available in U. S. (9)

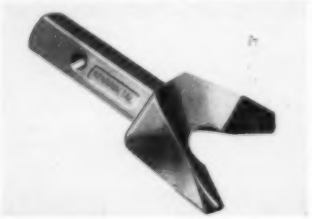
Reineveld centrifugal machines, manufactured by the Reineveld Engineering Works, Holland, now are being distributed exclusively in the United States and Canada by Heyl & Patterson, Inc. Used to separate solids from liquids or to separate two liquids, the standard Reineveld units for American use range in drum size from 36 to 80 in in diameter and operate with centrifugal forces up to 1,500 times the force of gravity. In many cases, one large Reineveld unit can handle the same output as several smaller machines, it is said. Among the features cited by the company is sturdy construction resulting from the patented design positioning the main bearing at the center of gravity of the rotating mass, which creates a high critical speed providing freedom from vibration. The Reineveld processing method provides a superior filter bed formation which, in turn, results in a dried product, shorter operating cycle and greater output, it is said. More data in Booklet 4-RC-2 from *Heyl & Patterson, Inc., Pittsburgh 22.*

### Tester Locates Faults in Electrical Equipment (10)

Newly developed portable PMD electronic tester, said to be so sensitive that it can detect a single shorted turn of No. 40 AWG wire, is designed to locate faults in and prevent breakdowns of electrical motors and generators of all types and sizes, as well as coils and similar electrical equipment using either AC or DC. According to the maker, the unit, which weighs only 13 lb, permits detection in a few seconds, even with unskilled labor, of the location as well as the nature of electrical faults in any type of winding, including open circuits, shorts to ground, shorts between phases or turns, reversed terminal connections, wire breakage and material defects. Unlike testers requiring that windings be energized, the PMD test probes generate their own fields in the probes, it is said. Full details from *Columbia Technical Corp., 5 E. 57th St., New York 22.*

### Bit Drills Faster in Brittle Coal (11)

New Kennametal Style DL bit drills brittle coal at unusually fast rates of penetration through reduced surface contact of the cutting edge at the bottom of the hole, with steeper clearance angles provided to minimize drag, the maker says. The new design is said to penetrate at a rate 10 to 20% faster than the conventional Kennametal all-purpose bit, but is more limited in application since it is used to drill coal containing few impurities. Also featuring low power consumption and consequent lower drill maintenance, DL bits are available with square shanks in sizes from 1⅝ to 3 in.—*Kennametal, Inc., Latrobe, Pa.*

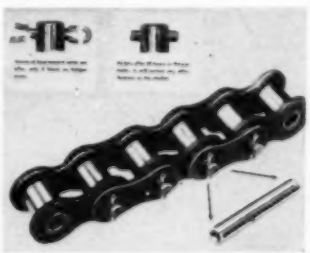


### Gun Grease Meets Varied Requirements (12)

New D-A Lithium heavy-duty lubricant has been developed to meet increasing demands for standardized gun greases resistant to water and extreme temperatures and combines positive water resistance with an extremely high melting point, thus providing tenacity to metal under the hottest operating conditions, according to the maker. Especially useful where stocking of specialized greases is a problem, D-A Lithium saves time and labor, is equally effective in summer or winter, and will not harden in bearings or separate in storage, the company reports. Incorporating the high percentage of heavier-base-oils feature of the D-A line, the new lubricant is packaged in 400- and 100-lb drums and 35-lb pails.—*D-A Lubricant Co., Indianapolis, Ind.*

### Roller-Chain Fasteners Give Longer Life (13)

"Rollpins," new roller-chain fasteners said to outlast cotter pins by 10 to 1, will be available on most of the larger pitches of both standard and heavy series Morse roller chains, the company announces. The Rollpin is a chamfered-end slotted-steel cylinder that compresses easily into pin hole smaller than its own diameter, expands and locks into place until removed by hammer and punch, being re-usable almost indefinitely. Besides being the most durable fastener ever developed for roller chain, the Rollpin is equal in shear strength to cold-rolled pins of the same diameter and can't fatigue out even under the most severe conditions, the maker says. Details from the *Morse Chain Co., Detroit 10.*

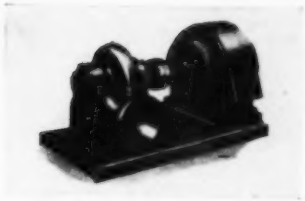


### Portable Furnace Also Moves Cool Air (14)

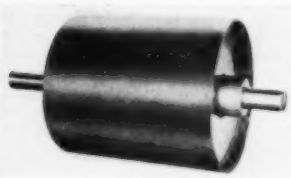
Improved portable furnace, which also circulates cool air in the summer in addition to furnishing heat in the winter, is known as the Fageol Dual Purpose Model 189. The unit delivers 189,000 Btu per hour, and as with other Fageol machines, heat is sprayed out over an area of approximately 3,000 sq ft concentrated in the work zone up to about 6 ft from the floor, it is said. Designed for easy conversion to a cool-air air blower, the machine will deliver 1,500 cfm by simply changing the top blower mounting, said to be a 5-min task.—*Fageol Heat Machine Co., Detroit 11.*

### New-Type Seal for Pump Line (15)

Recent design improvements in the Ingersoll-Rand line of small single-stage double-suction pumps make the units the first to incorporate double mechanical shaft seals with sealed prelubricated ball bearings, the company reports. The result is a compact totally enclosed pumping unit that requires minimum attention and maintenance and reduces floor space



needed, it is said. Built in 3-, 4-, 5- and 6-in sizes, the DMV (for medium heads) and the DHV (high heads) are designed for general hydraulic services at temperatures up to 200 F, capacities to 2,100 gpm and pressures to 150 psi. Use of the double shaft seal is said to offer more efficient sealing, prevent air leakage into the pump when operating under suction lift and provide longer service life in handling gritty and abrasive liquids.—*Ingersoll-Rand Co., New York 4.*

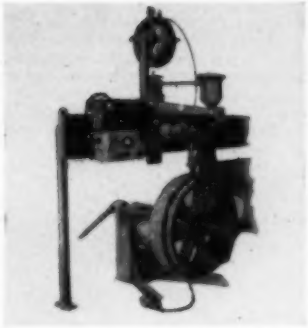


## Magnetic Pulley Offers Stronger Pull (16)

An entirely new engineering approach in the Magnetic Engineering "Radial Design" permanent magnetic pulleys makes for more positive separation of ferrous materials on conveyor lines, according to the manufacturer. By perpendicular magnetic placement, rather than parallel to the pulley circumference, material passing over the pulley is snapped and held firmly across the magnetic poles, thus bridging the magnetic gap and providing a stronger, more effective cross-pole pull, the company says. Catalog 152 with full data from *Magnetic Engineering & Mfg. Co., Clifton, N. J.*

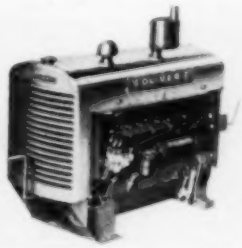
## Automatic Welder for Machinery Parts (17)

New "Conservall" fully automatic welder and resurfacing unit, designed for fast low-cost reclamation of track links, rolls, idlers, sheaves, etc., will handle any part or workpiece requiring a horizontal pass and, with the addition of a power-driven variable-speed "Rotator," will resurface any circular work. Complete tracks are placed in the Conservall trough and resurfaced by the submerged-arc method in a comparatively short time, with welding length and interval automatically controlled, it is said. The standard unit is 30 ft long and is made up of three 10-ft sections, each complete with work table or trough and rail for supporting the travel carriage and rack. Units can be made in multiples of the standard section and a 5-ft-long carriage-track extension permits moving the welding head over the Rotator when circular work is to be handled. Details from *Penn Tool & Machine Co., Danville, Ill.*



## Hydraulic Crane for Truck Mounting (18)

Latest model of the Pitman Hydra-Lift crane for mounting on the frame of any truck 1½ tons or larger features various improvements over the original unit, the maker states. The new model B requires only 40 in behind the cab of the truck, has a loadline capacity of 6,400 lb and a hydraulically powered swinging boom that telescopes from 12 to 17 to 22 ft. Among the recent improvements cited by the company is a big increase in the unit's safety margin and shipment almost completely pre-assembled, thus cutting the time and cost of installation. Bulletin from the *Pitman Mfg Co., Kansas City 5, Mo.*

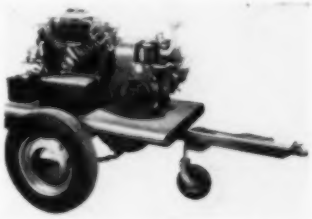


## Power Units for Diesel or Gasoline (19)

New heavier Oliver Series 199 stationary power units developing 73 hp are available for gasoline or diesel fuels, with development now being completed for LP gas. The 6-cylinder engine has a 4-in bore and stroke, a continuous rating of 1,800 rpm and intermittent rating of 2,000 rpm. Features cited by the maker include overhead valves, replaceable cylinder liners, maximum interchangeability of parts and mounting dimensions between diesel and carbureted models, and a new Bosch single-plunger injection pump said to be simpler and less expensive to service.—*Oliver Corp., Chicago 6.*

## Diesel Can Use Other Fuels (20)

Newly developed Lorain Model DA horizontal-type single-cylinder 2-cycle diesel engine, with a 13-in stroke and bore and a continuous rating of 55 bhp at 325 rpm, can be operated as a cold-starting full diesel or converted in the field to burn natural gas or butane. Among features listed by the maker are tapered roller bearings for the crankshaft and auxiliary shafts, a wet sleeve cylinder liner of alloy cast iron assuring long life and easy replacement in the field, and a radiator-type cooling system. Full data from *White-Roth Machine Corp., Lorain, Ohio.*



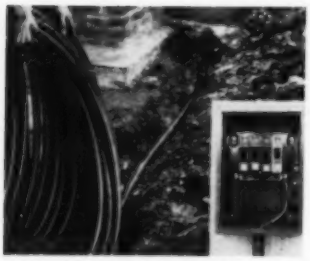
## Portable Compressors In Three Sizes (21)

New line of DeVilbiss portable air compressors, mounted on a trailer with a standard trailer hitch for towing behind a car or truck and also obtainable with skid mountings, is available in three sizes to deliver 21, 35 or 50 cfm. The units have V-type 4-cylinder 2-stage compressors to assure long periods of dependable continuous operation and are driven by heavy-duty industrial-type air-cooled gasoline engines available with either electric or magnetic engine-starting systems. The chassis of the units also serves as a tank tested for 300 psi and is equipped with a drain for accumulated moisture, with crossbraced construction of heavy tubular and channel welded steel used in the frame. Details from *DeVilbiss Co., Toledo, Ohio.*

## Equipment Shorts You'll Want to Check

**(22) TAMPING PLUG,** known as the "Permi-Seal" has been approved by the Pennsylvania Dept. of Mines for permissible use in bituminous mines, in addition to the USBM approval. The device consists of an asbestos-paper cylinder, sodium-bicarbonate pellet and asbestos-cement wedge. Information from *Quick-Seal Products, Inc., Herndon, Pa.*

**(23) PLASTIC PIPE** makes an effective insulated conduit for enclosing and pro-



tecting all types of electric wiring, above and below ground, the maker reports. Flexibility of Carlon pipe permits speedy and low-cost installation with a minimum of fittings. It is guaranteed against rot, rust and electrolytic corrosion and has withstood tests of more than 20,000 v, it is said. Details from *Carlon Products Corp., Cleveland 5.*

**(24) CRUSHER** has been especially designed to reclaim fused welding flux produced by automatic submerged-arc welding for re-use, reducing high cost of wasted flux without sacrifice in quality of the weld. The Holmes Model 2C removes tramp iron and will return most of the reclaimed flux to its original size consist. Bulletin 104 with full data from *Robert Holmes & Bros., Danville, Ill.*

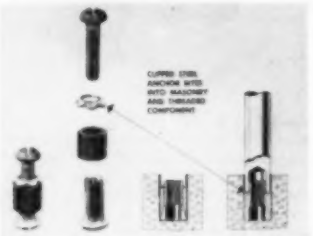
**(25) HOPPER TRUCK,** a new 4,000-lb-capacity electric high-lift platform truck with an extra-large 80-cu ft end-dump hopper is specially designed for handling bulky loads of various loose materials. The hopper can be tilted downward to scoop up loads, or it can be loaded from overhead. Details from *Yale & Towne Mfg. Co., Philadelphia Div., Philadelphia 15.*

**(26) CARBIDE-TIPPED DRILL**—Rock Bit four-point Intra-Set drill steel, made in 1⅛- to 2¼-in-gage sizes up to 12-ft long and with shanks to fit any hammer, has no attachments to get loose, bind or strip since the alloy drill steel and carbide bit are of one-piece construction, the maker states, in reporting faster drilling, less sharpening and longer life. Bulletin from *Rock Bit Sales & Service Co., Philadelphia 25.*

**(27) DETACHABLE LINK-BELT** is prestretched, will not slip, can run in either direction, yet costs no more than conventional V-Link belts now in use, according to the maker. The Brammer V-Link belt, offering features that prevent distortion after usage and permit smooth vibration-free service at top speeds in either direction, are made from tough woven cloth impregnated with top-grade heat-and-oil-resistant crude rubber, it is said. More data from *Brammer Co., New York 12.*

**(28) SAFETY GOGGLES**—Improved all-plastic safety goggle, known as the Willson No. 91 MonoGoggle features a flexible fully transparent frame molded of vinylite comfortably conforming to all facial contours, with an acetate lens that is separately replaceable. The goggle weighs just over 1 oz and fits easily over all types of prescription glasses.—*Willson Products, Inc., Reading, Pa.*

**(29) POURING SPOUT AND TILTER** is designed as method of pouring liquids into smaller containers that will prevent accidents and save materials. The safety air-vent pouring spout fits any size bottle and assures a smooth even flow without spurts or splashes, it is said. Details or trial order from *General Scientific Equipment Co., Philadelphia 32.*



**(30) MASONRY ANCHOR**—Utilizing the rigidity of steel to supplement lead as an anchoring medium, patented Super-Grip screw anchor is easily installed and provides increased anchorage strength and resistance to vibration wherever machine screws, stove bolts or wood screws must find an anchor in brick or masonry, it is said. When the unit is driven into place, the lead sleeve mushrooms out and the cup-shaped fluted steel anchor collapses, forcing its sharp edges into masonry and the threaded component. Catalog from *Super-Grip Anchor Bolt Company, Inc., Philadelphia 40.*

**(31) ACCURATE, LONG - RANGE WEATHER FORECASTING** is possible with its monthly weather maps that predict weather conditions 30 days in advance for each month of the year, by days, cities and areas in the United States, the maker says. The 11¼x17½-in 3-color map also shows temperatures by cities. It is available on an individual yearly subscription basis or in any quantity for mailing to customers and prospects. Details and sample map from *Blewett Weather Service, Pasadena 5, Calif.*

**(32) JET CLEANING UNIT** able to throw a solid stream of hot chemical and provide a separate high-impact jet of water, the Sellers Chemo jet cleaner handles all requirements of two-step cleaning needed to remove smokehouse deposits, paint and similarly stubborn matter, the maker says. Installation requires only connection to plant steam and cold water lines. Complete details in Bulletin C-4 from the *Sellers Injector Corp., Philadelphia 30.*

# EQUIPMENT BULLETINS AVAILABLE

**(37) MINING-MACHINERY LUBRICATION** is discussed at length in the 24-p revised fourth edition of "Coal Mining Machinery Lubrication" issued by Cities Service Oil Co., New York 5. It covers lubrication requirements and problems for a wide range of underground and surface coal-mining equipment and contains a 6-pg chart providing recommendations for lubrication of specific machines.

**(38) LOADING MACHINE**—Folder 2015 offered by the Myers-Whaley Co., Knoxville, Tenn., provides full information on the construction and operating features of the crawler-mounted Whaley "Automat" designed for off-track loading. In addition to detail and application photos, the booklets contains design information and dimension drawings.

**(39) ELECTRIC MOTORS**—Construction features of Allis-Chalmers dripproof

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(Type AW) and splashproof (Type AWW) squirrel-cage induction motors are described in new Bulletin 51B7693 available from Allis-Chalmers Mfg. Co., Milwaukee 1, Wis. Motors described include ratings in 40-C-rise continuous-rated open dripproof, and 50-C-rise splashproof construction, from 15 hp at 450 rpm to 800 hp at 3,600 rpm.

(40) **SOIL-SAMPLING TOOLS**, diamond and shot core drills, drilling accessories and equipment are covered in Bulletin 23 offered by the Acker Drill Co., Inc., Scranton 3, Pa. Included are detailed specifications of the tools and equipment, together with application recommendations and information on sampling techniques.

(41) **SHOVEL-CRANES**—Catalog 2373 covering the complete line of Link-Belt Speeder shovels, cranes and draglines includes photographs, brief descriptions and applications of 16 models, ranging from ½- to 3-cu yd capacities, 10- to 60-tons lifting capacity, and available as crawler-mounted, wheel-mounted and truck-mounted equipment. Available from Link-Belt Speeder Corp. Cedar Rapids, Iowa.

(42) **HYDRAULIC CUTTING TOOLS**—Catalog 153 from the Manco Mfg. Co., Bradley, Ill., describes the "Guillotine" line of portable hydraulic cutting tools available in six series and 26 different models. Used for a wide variety of industrial cutting applications, Manco Guillotines are said to exert up to 50-tons thrust and cut materials ranging from ⅛-in steel rod to 3½-in armored cable.

(43) **ELECTRICAL CONTROLS**—New 8-pg selection guide, Bulletin GEA-5781 issued by General Electric Co., Schenectady 5, N. Y., covers a wide range of electric and electronic controls, devices and accessories, with quick-reference selection data. Products included are: manual, magnetic, combination and reversing motor starters; pushbutton stations; relays; limit switches; solenoids; photoelectric relay; electronic timer; electronic relay; pressure and vacuum switch; float switch; pressure governor; reduced-voltage starter; Thy-mo-trol drive; and smoke-density indicator and control.

(44) **ROCK BITS**—Forged-steel rock bits in three socket series and seven types of hollow-steel drill rods are described in Catalog V-1706 now available from Drill Bit & Tool Co., Midland, Pa. DBT Midland bits for mining and other industries are shown for ⅞-, 1- and 1⅛-in sockets, with bit sizes ranging from 1¼ to 2⅝ in, with either center or single side hole obtainable. Companion drill rods in hexagon, quarter-octagon and round types, with standard lengths to 80 ft, are shown.

(45) **HEAVY-DUTY TRUCK DRIVES**—Bulletin 520401 illustrates varied applications and provides detailed specification data on the 50 models of Marmon-Herrington high-speed high-performance "All-Wheel-Drives" available for various models of Ford trucks. Booklet offered by Marmon-Herrington, Inc., Indianapolis 7, Ind.

(46) **CENTRIFUGAL PUMP**—Kenco, Inc., Lorain, Ohio, has issued a specification folder describing its new Model P-104 all-purpose centrifugal pump, a completely submersible pump, hermetically sealed, that is said to handle a wide variety of liquids. With extremely compact dimensions, 7¼ in high by 5 13/16 in wide, the pump has a maximum capacity of 1,000 gal at zero head and a maximum head of 9 ft.

(47) **PUMP REHABILITATION** with Synco neoprene-base coating compound by resurfacing impellers badly pitted by cavitation is illustrated in a bulletin available from the Synco Corp., Emmaus, Pa. Full details of surface preparation and application to provide acid- and corrosionproof coatings for various fast-wearing pump parts are included.

(48) **WORM GEARS**—Cleveland Worm & Gear Co.'s new general Catalog 400 has 180 p illustrating and describing each model in the complete line of Cleveland worm-gear speed reducers, as well as worm and gear sets for built-in power transmission applications. It contains engineering and application data on each

## Four New Slidefilms for Training or Group Showings

(33, 34, 35) **CENTRIFUGAL PUMPS**—Three 35-mm sound filmstrips running about 30 min each now are available for showing before interested groups from Allis-Chalmers Mfg. Co., Milwaukee 1, Wis., as the first in a series of new educational services to industry. The films may be obtained from district offices of the A-C General Machinery Div., and by circling the number noted on the postage-free card above, you may obtain an illustrated booklet and more information on each film.

"Pump Maintenance Film (Circle 33 above) shows how to set up a centrifugal pump, starting procedure, lubrication, packing maintenance, mechanical seals, piping tips and operating records.

"How and Why of Centrifugal Pumps" (Circle 34 above) shows parts and nomenclature, theory of operation, measurement of characteristics and interpretation of curves.

"Covering All Angles" (Circle 35 above) describes selection of a pump and provides information required to figure its installation.

(36) **ELECTRIC MOTORS**—A 35-mm sound-slide film and allied literature on "Selection and Application of Fractional Horsepower Motors" announced by the General Electric Co., Schenectady 5, N. Y., has been added as the 10th film in the company's "Motor Selection Course," a training program launched last year. Designed to aid in the rapid training of personnel in the selection and application of modern electric-motor drives, the course now consists of 10 slidefilm "lessons" (each with a 16-in sound recording), 10 copies of each student review booklets on the lessons and an instructor's manual, all packaged in a luggage-type carrying case. The lessons cover motor fundamentals and provide separate films on various types of motors. For more information on the course, circle 36 on the postage-free card above.

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unit, including dimensions, weights and rating tables. Offered by Cleveland Worm & Gear Co., Cleveland 4.

(49) **SHOVEL-CRANE**—Catalog 700-G-21 describing the new American ¾-yd crawler crane points up the features and availability of interchangeable fronts—crane, shovel, dragline or pull shovel—and lists over-all specifications. Offered by American Hoist & Derrick Co., St. Paul 1, Minn.

(50) **RUBBER-HOSE ASSEMBLIES** for vari-purpose applications, for hydraulic, paint and solvent spray and lubrication uses, are covered in Catalog 3-1952 made available by the Carlyle Rubber Co., New York 7. Included are construction features, sizes, specifications and prices.

(51) **DUST CONTROL**—Pangborn Corp., Hagerstown, Md., offers a 28-p Bulletin 909A entitled the "Control of Industrial Dust." It describes the Pangborn "CH" system of control which utilizes cloth-type filters for the collection of finely divided dry dust. Included are recommended applications, case histories and detailed performance data.

(52) **SPEED-REDUCER OVERLOAD RELEASE**—Bulletin A-616 from Dodge Mfg. Corp., Mishawaka, Ind., contains full information on the newly developed "Tri-Matic" overload release for use with its line of "Torque-Arm" speed reducers. Full engineering data necessary for specification and application, along with prices, are included.

(53) **DRY-TYPE TRANSFORMERS**—Catalog 6-01 on indoor and indoor-outdoor dry-type transformers offered by Magatran Inc., Kearny, N. J., covers the easy-to-install features of the units, which are rated at 600 V and below, single phase, 3 to 200 kva.

(54) **LOW-COST MATERIAL HANDLING** in varied applications of its Moto-Bug is shown in a new bulletin issued by the Kwik-Mix Co., Port Washington, Wis. Basically a power wheelbarrow with a 10-cu ft hopper body, the Moto-Bug has been developed into an all-around materials-handling device through easily interchanged front-end attachments that include a 1,500-lb platform body, a 1,000-lb hydraulic fork lift and a 5-ft scraper blade.

(55) **VALVES**—Bulletin from Fairbanks Co., New York 3, entitled "Valves of Iron" was prepared to show in a concise form general specifications of Fairbanks standard iron gate, globe and check valves. It also includes, with specifications, valves approved by the Underwriters' Laboratories and New York City for fire-line installations, and the iron gate valves that conform to the specifications of the American Water Works Association.

(56) **FORK-LIFT TRUCKS**—Three bulletins from the Buda Co., Harvey, Ill., illustrate and describe three models of its "FT Series" units, each available with gasoline or diesel power as follows: Bulletin 1579 on the 3,000-lb-capacity units at a 24-in load center; Bulletin 1580 on 4,000-lb models at 18-in load center; 1581 on 4,000-lb units at 24-in load center.

(57) **CANVAS PRODUCTS**—Booklet entitled "New Horizons" presents an account of the Daniels' facilities for the production of canvas and canvas products, together with features on the new treatments and applications of canvas for industrial usage. Available from C. R. Daniels, Inc., Baltimore 16, Md.

(58) **TACHOMETERS**—Data sheet 42P (revised) offers detailed data on selection and application of Metron tachometers for speed-measuring applications where a wide range of speed measurements is desired in a continuously indicating switchboard instrument. Available from the Metron Instrument Co., Denver 9, Colo.

(59) **CONCRETE FORTIFIER**—"Awog," a chemical added to concrete to produce longer wearing floors, and said to be resistant to acid, water, oil and grease, is described in a new folder issued by the Flexrock Co., Philadelphia 4.

(60) **ROOF RESURFACING**—Folder, "Specifications: Hallemite Cold Process Built-Up Roofs," explains and illustrates step-by-step installation of a one- or two-ply built-up roof with a cold-process method of treatment for repairing or completely resurfacing old roofs. Offered by Hallemite Mfg. Co., Cleveland 18.

(61) **ENCLOSED CONVEYORS**—Booklet 2475 on Link-Belt Bulk-Flo conveyors and elevators illustrates a wide variety of applications, together with typical layout drawings, engineering data, calculation tables, charts and formulas. Developed for the mechanical handling of a great variety of bulk flowable materials, Bulk-Flo self-feeding conveyor or conveyor-elevator consists of an endless chain with spaced solid flights in a close-fitting enclosure, for moving materials in horizontal, inclined and vertical directions. From Link-Belt Co., Chicago 1.

(62) **CORROSION-RESISTANT COATING**—Bulletin 500 from the Carboline Co., St. Louis 5, Mo., provides details on Carbo-Kote 6020, a corrosive-resistant thermosetting furan coating said to be easy to apply by brush or spray in any location without special safety precautions. Bond to properly prepared surface is permanent even under high-temperature variations and it is being used in many instances where baked-on linings, lead, rubber, glass or stainless steel were formerly required, it is reported.

(63) **INTEROFFICE PHONES**—Bulletin 1735 from Automatic Electric Co., Chicago 7, explains how private "inside" business telephone systems bring increased efficiency to large or small business organizations and discusses savings, installation, equipment and planning, offering a free comprehensive survey.

(64) **SPECIAL COATINGS** for plant maintenance covered in bulletin include 12 products for solving such problems as skidproofing, rust prevention, painting over damp areas, weatherproofing and decoration of exterior masonry, interior waterproofing, painting over hot surfaces, protection against acids, chemical fumes and other special maintenance work. Available from United Laboratories, Inc., Cleveland 12.

(65) **AUTOMATIC CONTROLS**—Eight types of the Model 40 controller are described in a new 32-p Bulletin 461 issued by the Foxboro Co., Foxboro, Mass., as follows: action, dual, duplex, auto-selector, ratio, relation, pneumaticset and time schedule. With its standard specifications or available modifications, every Model 40 instrument can be specifically engineered to its application, it is said, whether controlling temperature, pressure, flow, pH, conductivity or other process variable. The bulletin contains 114 illustrations and diagrams, helpful in understanding and applying the advanced principles of automatic control.

---

**CARD USERS NOTE— Please be sure to give your name, position and company to insure proper handling of your request. Since some cards have been received without names, we would be glad to have you check us if you have no response to your request within a reasonable time.**

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"Famous Blue Bits"
Streamline your roof drilling operations with FIRTHITE "Famous Blue Bits." These fast-cutting, free-cutting, cost-cutting Bits bring high speed production methods to even the toughest jobs. They increase tonnage by eliminating drilling bottlenecks." Whether it's a soft, medium, or hard roof—wet or dry drilling—there is a FIRTHITE Bit that will rotary drill it *better, faster and cheaper.*
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UNION SUPPLY CO., Denver 2, Colo.

# Point of Detonation ...Front or Back?

***Pictures show increased breaking of overburden with initiation at point of maximum confinement***

### *Point of Detonation: FRONT*

Here are five holes 2/3 second after detonation from the front. There is no perceptible movement of the high wall. Much of the explosives energy seems to be blowing out the holes, despite the fact that each had 16 feet of stemming. Possible explanation for this is that the blast began at the weakest point rather than at the back of the hole where the greatest degree of confinement can be gained.

### *Point of Detonation: BACK*

On the same high wall a single hole was drilled in the tight with no relief on either side. The same amounts of dynamite and stemming were used, but note that in this photo, also 2/3 second after detonation (at the *back*), the stemming is holding. And see that action on the high wall! Here the explosives force is being put to work efficiently and the burden gets the thorough shaking it must have for easy loading. Another instance where proper shooting technique can result in not only better breakage but in much less noise, less waste of power.

*Send today for your free copy of the 20-page* ROCKMASTER® *handbook giving loading patterns for milli-second delay blasting in coal stripping operations.*

**ATLAS EXPLOSIVES**

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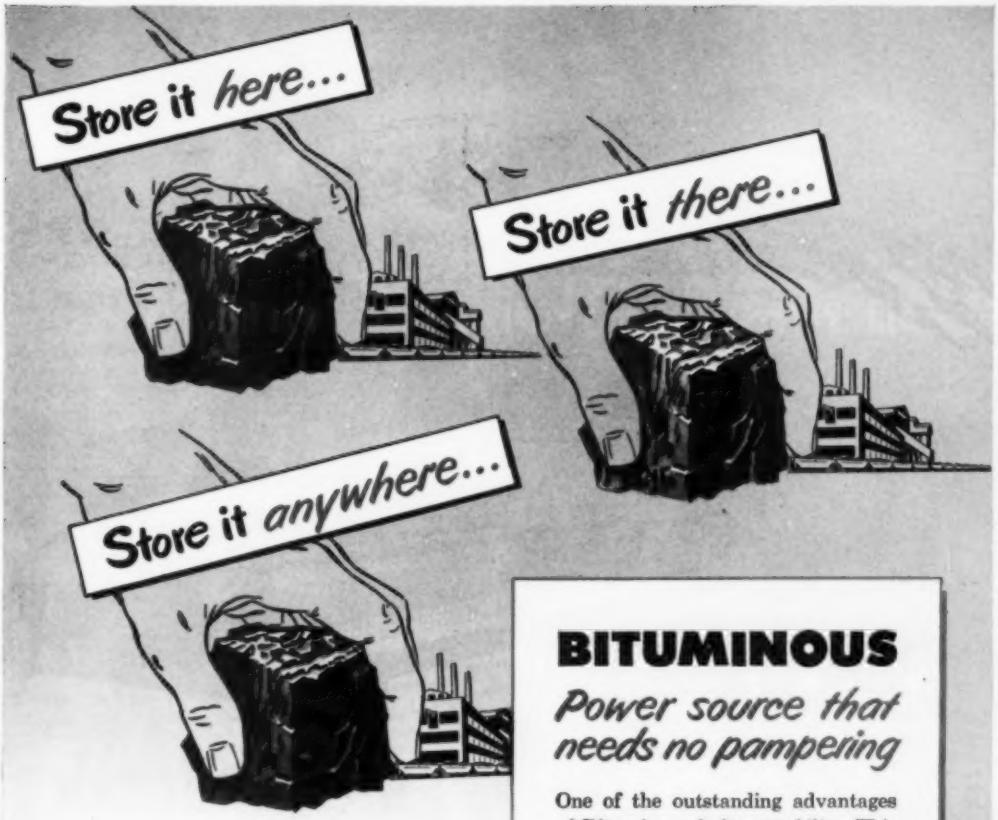
*"Everything for Blasting"*

**ATLAS POWDER COMPANY • WILMINGTON 99, DELAWARE**

***Offices in principal cities***

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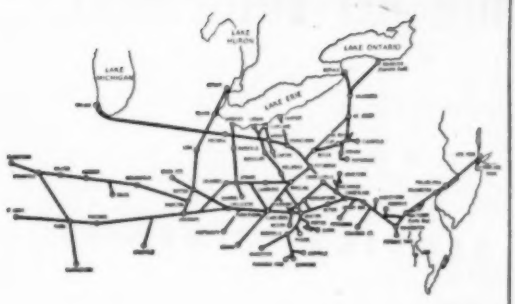
## *Power source that needs no pampering*

One of the outstanding advantages of Bituminous is its *storability*. This dynamic, low-cost fuel can be stockpiled anywhere—in any volume. Construction of storage facilities is not required when fuel needs increase.

Add to this the *excellence* of Bituminous mined along the Baltimore & Ohio, the wide *variety* available, and its *accessibility* through convenient transportation to industrial centers —and you have ample reason for choosing B&O coals. For helpful advice, *ask our man!*

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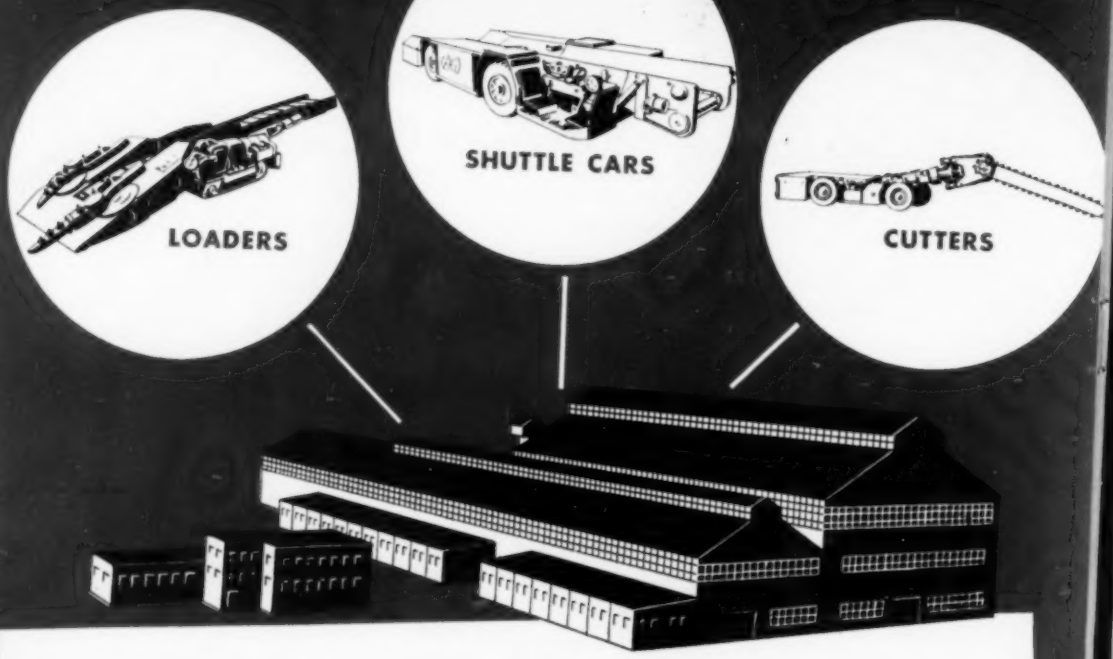
**BALTIMORE & OHIO RAILROAD**

**Constantly *doing things*—better!**




# Now! Faster-More Efficient Service

## FOR REBUILDING YOUR JOY EQUIPMENT

*The New Ashland Division*

(ASHLAND, KENTUCKY)

*of*

**NATIONAL MINE SERVICE COMPANY**

The new Ashland Division of National Mine Service Company at Ashland, Kentucky, provides the largest, most modern production facilities devoted exclusively to the rebuilding of Joy equipment. This new plant is centrally located and accessible by truck or rail to all major coal fields east of the Mississippi.

The new Ashland Division—with a backlog of experience gained through years of rebuilding specialization, and extensive warehousing of genuine Joy replacement parts—means better rebuilding service than ever before offered the coal industry—*plus a definite schedule of delivery.*

# *The New Ashland Division*

## HAS COMPLETE FACILITIES FOR REBUILDING

JOY

**• SHUTTLE CARS • CUTTERS • LOADERS**

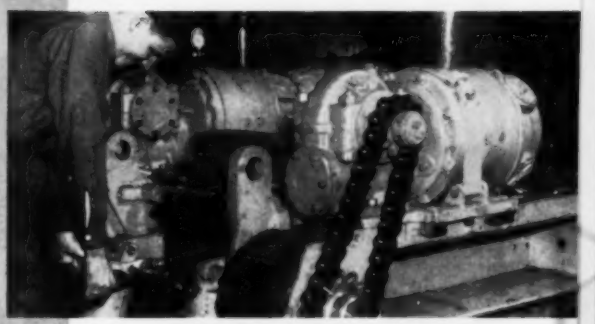
**Here's what the New Ashland Division offers you . . .**

1. ***Definitely Scheduled Delivery***
   Down time of your equipment is greatly reduced—you know when job will be delivered.
2. ***Cost Savings Through Advanced Methods***
   Efficient plant, methods and tools mean lower rebuilding costs for you.
3. ***You Need Not Carry Expensive Replacement Parts***
   Ashland carries an extensive inventory of replacement parts for all Joy equipment—eliminating costly inventory expense for you.
4. ***Genuine Joy Parts Used***
   Your Joy equipment is quickly renewed to initial factory standards with genuine Joy parts.
5. ***Superior Experience and Training***
   A key group of highly skilled Joy rebuilding specialists form the production and training nucleus for the new Ashland Division.
6. ***Changes to Your Specifications***
   At Ashland, refinements or special features may be added to Joy equipment to give the advantages of a later model, or to better suit your requirements.
7. ***Relieves Capital Expense on Your Part***
   No need now to do your own rebuilding. Ashland Division facilities and the use of genuine Joy parts makes possible savings in your plant, overhead and personnel. Also, down time is cut to a minimum, and a rebuilding job equal to factory standard is assured.

***Write for the New Ashland Division bulletin—Today!***

*NOW 7 plants to serve you!*

Re-wiring control panel



Installing new hydraulic system

Assembly area, showing four shuttle cars and a loader being rebuilt

**National Mine Service Company**

*HAS THE FACILITIES*

*DELIVERS THE GOODS*

**ASHLAND DIVISION**
Ashland, Kentucky

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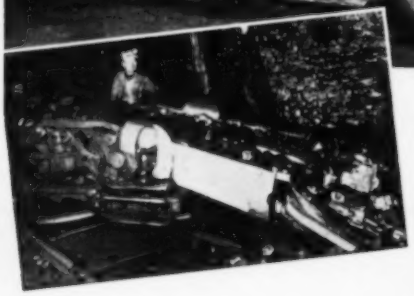
"*Trabon* HAS THE ONLY COMPLETELY ENCLOSED MEASURING VALVE THAT NOTIFIES THE OPERATOR IF TROUBLE DEVELOPS!"



# SAVE BEARINGS... INCREASE PRODUCTION... CUT COSTS WITH...

## *Trabon* LUBRICATING SYSTEMS

Many bearings can be handled from a single pumping point by Trabon. The Trabon system handles both oil and grease, and can be buried under coal dust, water, ice, dirt and grime with perfect safety . . . and with assurance that the sealed Trabon system will deliver just the right amount of clean lubricant to each bearing.

Trabon oil and grease systems are rugged, positive, dependable. On conveyors, loaders, crushers, washers, shuttle cars and cones, Trabon lubrication pays for itself through bearing protection, less down time and more production.

**TRABON ENGINEERING CORPORATION**
**1814 EAST 40TH STREET • CLEVELAND 3, OHIO**

*Trabon*
OIL AND GREASE SYSTEMS

# NEWS Round-Up

## Senate Okays Neely Safety Bill As House Compromise Progresses

The Neely coal mine safety bill giving federal mine inspectors power to close mines they consider unsafe was passed by the Senate May 7. The approval was indicated by a voice vote, without opposition, and only seven senators were present at the time of the vote. Under the measure, provisions of the Federal Safety Code as set up by the USBM must be complied with and any operator failing to close a mine as ordered by a mine inspector is subject to a $2,000 fine or 6 mo in jail, or both.

In passing the bill, the Senate adopted an amendment offered by Sen. Dirksen (R., Ill.). It provides that when mine management corrects the unsafe condition cited by the inspector for closing the mine and notifies the USBM, management may re-open the mine if the Bureau does not re-examine it within 5 days (exclusive of Sundays and holidays) and confirm the inspector's findings.

Earlier, on May 2, the House Subcommittee on Education and Labor approved H.R. 7408, a bill authored by Rep. McConnell (R., Pa.) previously reported as compromise measure reflecting the views of mineworkers, Bureau and some management interests (*Coal Age*, May, p 127). The bill must be approved by the full committee before action can be taken by the House.

The McConnell measure differs in various respects from the Neely Bill. It provides that a federal inspector can close a mine where there is "imminent danger" of explosion, fire, inundation, man-trip or man-hoist disasters and also permits an inspector to close a mine if operators fail to comply within "reasonable" time limits set for correction of code violations relating to the specific hazards covered. Operators of closed mines can appeal directly to the director of the USBM, or to a Federal Coal Mine Safety Board of Review which can uphold or overrule the Bureau. Rulings of either the Bureau director or the Board of Review can be appealed by application to the federal circuit court in the district in which the mine is located. It does not permit the Bureau to make broad and comprehensive regulations for mine operation as does the Neely bill.

**COMING IN JULY . . .**

**"DESIGN FOR MODERN MINING" will present a comprehensive up-to-the-minute appraisal of new mining methods, equipment and ideas for high-efficiency low-cost mining, together with the best thinking of operating men and equipment makers on possible improvements. Be sure to watch for *Coal Age* next month.**

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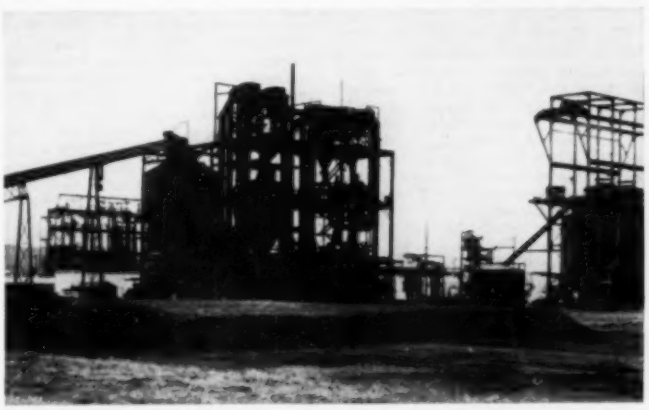


## Pilot Plant Opens New Chemical Vista for Coal

SEVENTEEN YEARS and a $16,000,000 investment in coal-hydrogenation research soon may begin paying off for Carbide & Carbon Chemical Co., subsidiary of Union Carbide & Carbon Co. The company unveiled a brand-new $11,000,000 pilot plant early in May at Institute, W. Va.

For coal, the pilot plant eventually may create a new customer that will offset some market losses in other fields and help smooth out seasonal ups and downs in coal output. For general industry and the public, the pilot plant may be the key that unlocks a new wealth of industrial chemicals now in short supply and a steady stream of new consumer products such as medicines, fabrics, paints, detergents and insecticides. Demand for industrial chemicals, especially the aromatics, already has far outstripped the ability of by-product coke ovens to produce them. Commercial-size plants, built to the pattern of Carbide & Carbon's pilot plant, could keep pace with demand for these chemicals, which has been growing 30% per year.

The pilot plant uses only 300 tpd of bituminous but it has enabled Carbide & Carbon engineers to lick most of the problems that have stumped other hydrogenation experts, as well as economists. The company went into the project with the aim of making chemicals, not liquid fuels, from coal. That's why its process is cheaper than that used by the U. S. Bureau of Mines demonstration plant at Louisiana, Mo. Making chemicals from coal is a one-stage hydrogenation process. Carrying the process through to liquid-fuels production would mean adding a second stage at higher costs.

# News Briefs and Trends

### Peacetime Atomic-Energy Use Aim of New Research Agency

The Atomic Energy Commission May 1 set up a new office to help private industry turn atomic energy to electric power and other peacetime uses. The new agency, headed by Dr. William Lee Davidson, nuclear physicist, is called the Office of Industrial Development. Studies prior to the establishment of OID were directed mostly at making electric power from the atom. The OID will seek wider industrial applications. Electric power studies will continue, AEC added. In fact, Dow Chemical Co. and Detroit Edison, one of four research teams authorized by AEC, already have submitted proposals for going beyond preliminary investigations of atom-made power. The program envisions use of a nuclear reactor to make electric power and plutonium simultaneously, the plutonium to be sold to the government and the power to be marketed through private channels.

### Pennsylvania Strippers Fight Increase in Freight Rates

The Central Pennsylvania Open Pit Mining Association is protesting proposed freight-rate increases on intrastate movements of coal. The higher rates now are in effect, though the Pennsylvania Public Utility Commission has not yet given formal approval. Commenting on the protest, G. Albert Stewart, executive secretary of the strippers' organization, said, "Since 1903 northern West Virginia has enjoyed a 25c-per-ton differential in freight rates to Philadelphia and the Eastern Seaboard. The freight rates have been increased many times and substantially but no change has ever been made in the 25c differential . . . Coal may be hauled from the extreme western part of Pennsylvania and from the Fairmont district of West Virginia to Philadelphia and New York, a distance of over 110 mi more than the distance from our field, for a mere 25c per ton."

### Set Next Safety Meet for 1953

The next National First-Aid and Mine-Rescue Contest has been set tentatively for the week of Sept. 21, 1953, according to a recent announcement by J. J. Forbes, director, USBM, and president, Joseph A. Holmes Safety Association. Place for the meet has not yet been set, he added. There will be no national meet in 1952.

### Tell Others, Too . . .

**NEWS OF YOUR ORGANIZATION is also interesting to others, so why not make it a point to inform COAL AGE of personnel changes among your staff members, mine-development plans and unusual activities. Write The Editor, COAL AGE, 330 West 42nd St., New York 36.**

### New Keystone Edition Ready

The 1952 edition of *Keystone Coal Buyers Manual* now is available for distribution. A helpful tool for coal users, the new edition contains up-to-date information on coal-producing companies and their coals; number, location and size of mines; cleaning equipment used, sizes produced; number of employees, seam of coal mined and characteristics; data on sales organizations; a list of trade names; and complete indexes. Copies of the new volume may be obtained by addressing Keystone Coal Buyers Manual, 330 West 42nd St., New York 36, N. Y.

### New River Group Seeks Wider Interest in Safety

Over 350 persons attended the first open meeting of the New River District Safety Committee held recently at Mt. Hope, W. Va. Aim of the open meeting was to develop a community interest in safety, said Stanley C. Higgins, committee secretary. Mine managers, superintendents, supervisory and safety officials, as well as 18 students from West Virginia University School of Mines and representatives from high schools in Fayette and Raleigh Counties, were in the audience that heard addresses by Joseph Bierer, administrative assistant, West Virginia Department of Mines; H. E. Quenon, chief of the USBM's Mt. Hope branch; and Crawford L. Wilson, safety director, New River & Pocahontas Consolidated Coal & Coke Co. H. G. Houtz, chairman, New River District Safety Committee, presided.

### Program Shapes Up for Open-Pit Electrical Group

Three members of the faculty of Purdue University, a lighting engineer, an electrical expert and a metals engineer already have been booked as speakers for the 1952 annual meeting of the Electrical Div., Open Pit Mining Association, to be held July 25 in the Electrical Engineering Building, Purdue University, West Lafayette, Ind. Cecil Guthrie, general superintendent, Sinclair Coal Co., Kansas City, Mo., will steer the meeting as master of ceremonies.

### Reactivated Indiana Institute Sets Date for Meeting

The Indiana Coal Mining Institute, recently reactivated, has set June 21 as the date for its summer meeting. The meeting will be held at Terre Haute, Ind. J. J. Forbes, director, USBM, will be the banquet speaker.

### Iowa Reclaims Strip Land

The Iowa Agricultural Experiment Station, Iowa State College, Ames, Iowa, has started research to find ways of reclaiming hundreds of acres of southern Iowa land from which coal has been stripped. Funds for the study are being provided by the Iowa Coal Research Association, a group of strip-mine operators. A total of $16,500 has been subscribed to support a 3-yr program. Exploratory plantings already have been started on lands of Sinclair Coal Co., Pershing; Lanning Coal Co., Kirkville; June Coal Co., Bussey; and Laddsdale Coal Co., Selma.

### ACI Pushes Summer Sales In Retailer-Help Booklet

**AS A GUIDE TO RETAILERS** interested in increasing sales of bituminous coal during the summer months, a brochure entitled "Aim High—Big Increase in Summer Sales" has been published by Appalachian Coals, Inc., Cincinnati. ACI hopes that retailers will accept the sales plan as a means of reaching the best markets available and use it to emphasize to customers the importance of buying coal when it can be delivered most economically. The program is unusual in that ACI will provide direct-mail cards in the promotion kit at below cost and newspaper mats free, even though they make no mention of a particular coal. The early response from retailers has been far beyond expectations, it was reported.

### Stoker-Coal Test Revised

Revision of the Standard Procedure for Testing and Evaluating Bituminous Stoker Coals has been completed, according to a report issued jointly by the Stoker Manufacturers' Association and Bituminous Coal Research, Inc. Changes are based on experience in three laboratories equipped for making the tests. Revision consists principally of eliminating certain features that were troublesome. The result is a simpler test without loss of essential information, the announcement said.

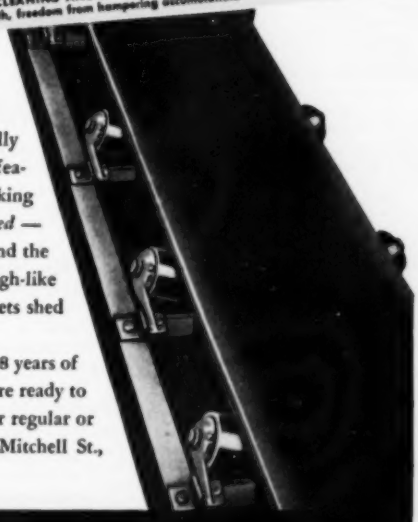
# Lippmann *life-sealed* Ball Bearing Idlers

SHAFTS ARE FIRMLY HELD in place, yet loosening a set screw makes them simple to remove if necessary.
CLOSE ROLL SPACING provides maximum belt support, guards against pinching belt, minimizes crossing. Perfectly concentric assembly gives smooth operation with less wear and tear.
PERMANENT LUBRICATION eliminates periodic greasing. No costly catwalks. No danger of bearing opposite grease fitting not being lubricated when grease congeals. Bearings positively sealed against dirt and moisture.
DEAD SHAFT operation means larger bearing area to take radial load.
BALL BEARING action is life-time true-running, takes both thrust and radial loads. Bearings can't drag.
STUB SHAFT saves cost, saves weight, is self-aligning.
TROUGH RING on idler heads plus hooded bracket shed dirt and water—give additional protection to bearings.
HEAVY WELDED steel base with triangular section gives absolute rigidity and sheds dirt.
ALL ROLLS IDENTICAL for complete interchangeability, eliminating "loss-time" fitting.
TOUGH MALLEABLE IRON support brackets are extremely rigid and accurately located.
DISHED, HEAVY-SECTION idler heads pressed and rolled into machined seat in tube give permanent alignment for bearings and idler faces.
SLOTTED BASE HOLES permit quick, easy adjustment and alignment.
SMOOTH, ROUNDED, CONTINUOUS ROLL EDGES for longer belt wear and smooth action.
SELF-CLEANING ANGLE BASE assures added strength, freedom from hampering accumulation.

## Shielded for hard mining service

Meet the champion of heavy duty conveyor idlers, built specifically for hard mining service! Compare its construction, feature by feature, with *any* other and you'll agree it's the idler you've been looking for. These Lippmann Life-sealed idlers are *permanently lubricated* — the cost of catwalks and periodic greasing has been eliminated and the bearings are sealed against water, dirt and wear. In addition, trough-like rings on the idler heads shielded by hoods on the support brackets shed dirt and water away from the bearings.

Lippmann conveyors and other mining machinery are backed by 28 years of manufacturing and application experience. Lippmann engineers are ready to help you, and a card or letter will bring prompt attention to your regular or special requirements. Lippmann Engineering Works, 4627 W. Mitchell St., Milwaukee 14, Wisconsin.



LEW **LIPPMANN**

CRUSHERS FEEDERS SCREENS CONVEYORS ELEVATORS HOPPERS BINS

## Truax-Traer Supervisors Form Management Club

Key management personnel of the West Virginia Div., Truax-Traer Coal Co., recently formed the Truax-Traer Management Club and accepted a charter as an affiliate of the National Association of Foremen. Membership of the group totals about 150, representing operating and administrative staffs. Officers of the Truax-Traer club are: president, R. E. Powell; vice presidents, R. C. Mitchell Jr. and Vivian Morgan; treasurer, H. B. Glasscock; secretary, Mike Rich. The officers, together with Sam Kraft Jr., Owen Michaelson and E. M. (Max) Cassidy, are directors.

Officers shown studying the club bylaws above are Messrs. Glasscock (left), Rich, Powell, Morgan and Mitchell.

## Governor Ousts Alexander as Chief of W. Va. Mines Dept.

Dismissal of Arch J. Alexander as chief of the West Virginia Department of Mines was reported May 12 in a three-sentence announcement from the governor's office. Joseph Bierer, administrative assistant in the department, was named acting director until selection of a new mines chief could be made.

Mr. Alexander's dismissal allegedly was a result of political activity, but other reports maintained that it stemmed from his opposition to the Neely mine safety bill. It was also believed that the continuing opposition of the UMWA to Mr. Alexander was an important factor. He had been denounced for his political views by George Titler, UMWA district president, after a speech he made during the previous weekend.

## And for Your Information . . .

**British miners' opposition** has turned thumbs down on a plan to import Italian coal miners, in spite of the drastic manpower shortage Great Britain faces. The National Coal Board last month told 1,000 Italian miners who had been brought into the country and trained at a governmental cost of some $400,000 that they'd have to find jobs in other industries or leave the country.

**The Norfolk & Western** continues to indicate its preference for coal by positive action. Last month the line announced that it had okayed construction of 15 additional modern coal-burning switching locomotives and 2,025 freight cars, including 1,500 gondolas.

**The Sinclair Coal Co.** celebrates its 50th anniversary this year. In 1927, the company's one Oklahoma mine produced 7,000 tons. In 1951, the company produced over 9 million tons and ranked sixth among the country's leaders. As a part of its anniversary activities, Sinclair will distribute a quarter-million specially designed matchboxes.

**Pittsburgh industries** are spending big money to fight air pollution. They have already spent or assigned some $200 million and will put at least another $100 million into research or purchase of equipment, smoke-control officials have reported.

**UMWA District 28** was up against new legal difficulties last month as a result of its organizing drive in the Wise County, Virginia, area. Four nonunion miners sued for a total of $500,000, charging "terrorism" in a disturbance May 10, 1951. Two suits totaling $250,000 had previously been filed on similar grounds. Hearings on the $350,000 damage suit brought by ousted union official Charles Minton were delayed until the latter part of May.

**Retail coal prices** may be increased 6¢, or a maximum of 20¢ a ton, to pay for increased railroad freight costs, the OPS has announced, effective May 24.

**The Hazard Coal Operators' Association** and the Kentucky River Mining Institute played host May 5 to 70 high school seniors in a tour of the mine and cleaning plant of the Knott Coal Corp., Anco, Ky. The "Seniors' Day," an annual event, is designed to present the future coal mining offers young men.

**EG&FA's Coal Div.** expects more than 900 sons and daughters of its employees at its children's camps this summer. There will be five 2-wk camping periods from June 23 to Aug. 21 and children from its mining communities in West Virginia, Kentucky and Pennsylvania will participate.

**The Sterling Coal Co.,** Bakerton, Pa., has donated 11 acres of land near the center of town for use as a community recreation park. Citizens in the area have formed a park association to build a $100,000 park that will have a swimming pool, community buildings, playground and picnic facilities.

## SAFETY MILESTONES

**The entire personnel of the Osage Coal Co., Steamboat Springs, Colo., an affiliate of the Pittsburg & Midway Coal Mining Co., shared honors March 28 at a dinner celebrating a full year of operation since Jan. 1, 1951, without a lost-time accident. Citing obstacles overcome in setting the accident-free record at the new property, which began producing in 1950, company officials pointed out that snowfall during the past winter was over 240 in. The mine is 7,000 ft above sea level.**

**The Honor Roll of the Coal Div. of Eastern Gas & Fuel Associates lists 398 foremen at its 21 mines who have supervised accident-free crews from 1 to 22 yr.**

**Employee prizes awarded at its semiannual safety meetings first started in 1931 have cost The Union Pacific Coal Co. $161,725. Provided to encourage improved safety on the properties and in the communities alike, the prizes have ranged up to automobiles and city lots.**

## NCA Education Group at VPI

Presentation of a watch to the outstanding senior in mining engineering, a run-through of Hanna Coal Co.'s new first-aid and civil-defense film, "Once in a Lifetime," and discussion of a minimum course in coal-mining engineering as a yardstick for measuring college courses featured a meeting of the Education Committee, National Coal Association, at Virginia Polytechnic Institute, May 16-17. On behalf of the Old Timers Club, S. M. Cassidy, president, Consolidation Coal Co. (Ky.), presented the watch to Richard R. Shockley. At the presentation dinner, a panel of mining engineers answered students' questions on mining and utilization.

## Warn Against Claims for Coal-Burning Aids

Some users of coal are being persuaded to make expensive installations and trials of special treating materials or catalytic agents on the claim that such materials will reduce smoke, soot, ash and clinkers, warns the Technical Advisory Board, Bituminous Coal Research, Inc. The board

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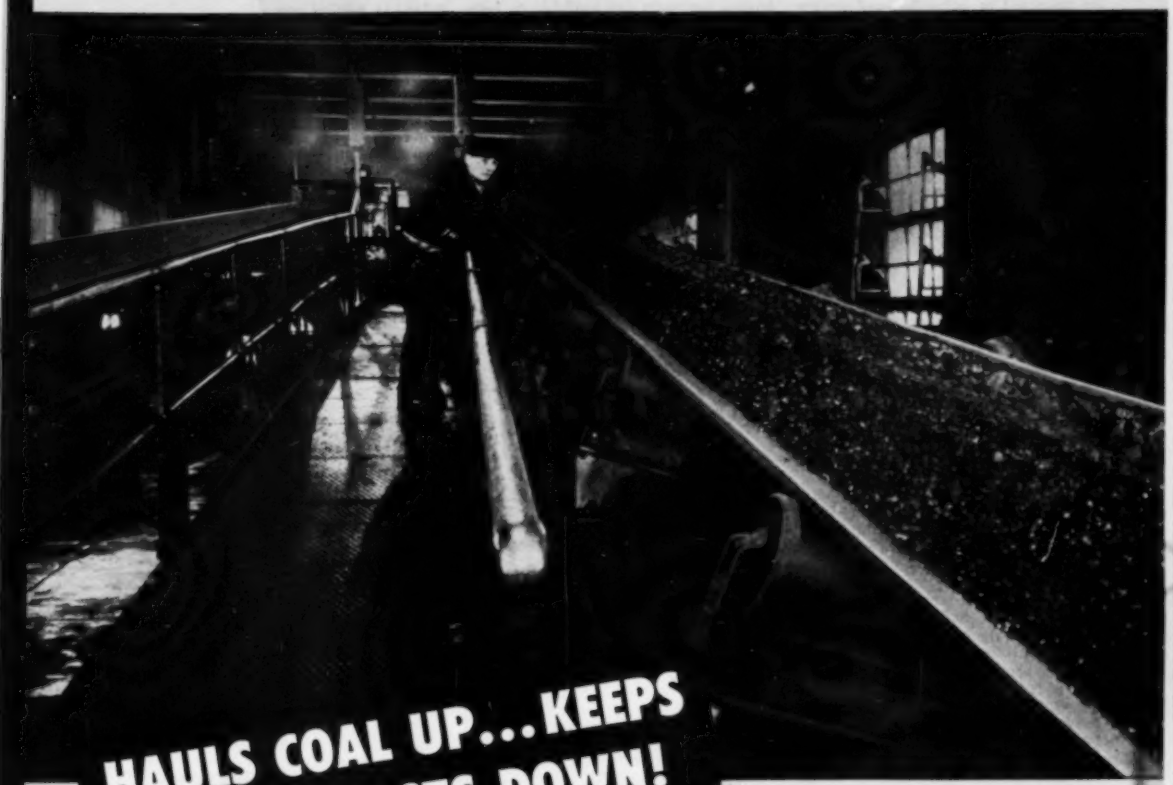

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cautions coal users that most such claims are unproved or unjustified and reports that tests made by the USBM, described in Bulletin 404, show that the use of such materials in economically feasible quantities does not accomplish the claimed results. Pointing out that combustion engineers are available to help coal users with burning problems, the board urges prospective buyers of such treating materials to make careful investigations before making commitments.

# Holmes Awards Cite Safety Achievements of Industry

A MINE OFFICIAL with EG&FA and a fatality, from July 10, 1942 through Jan. 31, 1952, and continuing, a total of 2,644,506 man-hours for an average of 183 employees, producing 2,050,551 tons of coal.

Pennsylvania coal miner were among the eight individuals awarded Medals of Honor by the Joseph A. Holmes Safety Association for individual deeds of heroism in saving life in mines and plants of the minerals industry during the past year, it was announced April 30. The organization was formed in 1916 to commemorate and further the work of the late Dr. Joseph Austin Holmes, first director of the U. S. Bureau of Mines, which sponsors the association.

The 416 awards for exceptional safety records and outstanding success in supervisory work were announced by J. J. Forbes, director of the Bureau, who is president of the association by virtue of his office. They were based some 550 recommendations received during the year and cited individuals, companies and mines in the coal, metal, nonmetallic and oil fields. In addition to the two men cited for heroism, 17 coal-mining officials and 98 companies and mines received awards for their safety achievements. A number of veteran coal miners were cited for long working periods without a lost-time accident. At the meeting approving the awards, the representatives of the various organizations attending elected R. G. Warnecke, of the Bureau, secretary to succeed Mr. Forbes.

One of the recipients of the Medal of Honor was **W. L. Laxton,** who, while assistant general mine foreman at the EG &FA Carswell mine, Kimball, W. Va., knowingly risked his life by running between the bumpers of a mine locomotive and the first car of a man-trip, shutting off the controller and preventing the unconscious motorman, who had been struck by falling slate, from falling between the moving cars.

**Charles F. Wesche,** a pumper at the Carpentertown mine of the Carpentertown Coal & Coke Co., also cited for heroism, led four fellows to safety after being knocked down by a mine explosion and risked his life by twice returning to the explosion area and helping to remove one of the victims.

**Certificates of Honor for outstanding supervisory work went to:**

**R. G. Blackwell,** section foreman, Mulga mine, Woodward Iron Co., Mulga, Ala., for supervising a section crew without a lost-time accident from Sept. 29, 1944, to Jan. 1, 1952, a total of 348,613 hours.

**Roy Castle,** mine foreman, Amherst Coal Co., Amherstdale, W. Va., for supervising Amherst 1B mine without a

**Oliver Cope,** outside foreman, Benning mine, Republic Steel Corp., Belle Vernon, Pa., for supervising an outside crew of 16 men for 3,908 days without a lost-time accident, from July 1, 1935 to Jan. 1, 1952, and continuing, a total of 549,877 man-hours.

**Earl H. Dodrill,** assistant foreman, Bethlehem Mines Corp., Barrackville, W. Va., for supervising a crew of 20 men in Mine No. 44 without a fatality, for a total of 1,047,446 man-hours while producing 1,309,950 tons of coal.

**W. B. Hayes,** superintendent, Amherst Coal Co., Lundale, W. Va., for supervising Amherst 1A, 1B, 1C and 3A mines without a fatality from July 10, 1942 through Jan. 31, 1952, and continuing, a total of 8,874,654 man-hours, for an average of 794 employees, producing 6,548,114 tons of coal.

**B. B. Henry,** superintendent-foreman, Truax-Traer Coal Co., Dorothy, W. Va., for supervising and directing an average of 200 employees without a fatality from Feb. 1, 1948 to Jan. 1, 1952, a total of 1,435,021 man-hours in the production of 1,247,221 tons of coal.

**Wm. J. Loudermilk,** general outside foreman, EG&FA, Elkridge, W. Va., for having only one lost-time accident while supervising a surface crew of 12 men from Jan. 30, 1930 to March 4, 1952, a total of 459,040 man-hours.

**Alex B. Martenelli,** assistant mine foreman, Banning mine, Republic Steel Corp., Smithton, Pa., for supervising an underground crew of 36 men for 1,010 days without a lost-time accident from April 23, 1947 to Jan. 1, 1952, and continuing, a total of 285,952 man-hours.

**George McClafferty,** tipple foreman, Russellton Mine, Republic Steel Corp., Indianola, Pa., for supervising a tipple crew of 19 men for 1,955 days without an accident from Sept. 1, 1943 to Jan. 1, 1952, and continuing, a total of 357,644 man-hours.

**James M. North,** outside foreman, Rochester & Pittsburgh Coal Co., DuBois, Pa., for supervising and directing a crew of 18 employees without a lost-time accident from Nov. 7, 1944, to Jan. 1, 1952, a total of 310,968 man-hours.

**Charles O'Brien,** mine foreman, Indianola mine, Republic Steel Corp., Indianola, Pa., for supervising an underground crew of 28 men for 1,087 days without a lost-time accident from Feb. 15, 1947, to Jan. 1, 1952, and continuing, a total of 339,868 man-hours.

**Ralph O'Brien,** cleaning plant foreman, Banning mine, Republic Steel Corp., Smithton, Pa., for supervising the operation of a cleaning plant of 66 employees for 1,047 days without an accident from Feb. 11, 1947, to Jan. 1, 1952, and continuing, a total of 516,698 man-hours.

**William Parisi,** mine foreman, Pittsburgh Coal Co., Library, Pa., for having no fatality since starting as foreman, Aug. 1, 1946, to Jan. 1, 1952, and continuing, in the production of 3,225,665 tons of coal.

**John Shaynak,** assistant mine foreman, Crescent No. 2 mine, Republic Steel Corp., Charleroi, Pa., for supervising an underground crew of 16 men without a lost-time accident for 2,082 days from Feb. 28, 1943, to Jan. 1, 1952, a total of 263,802 man-hours.

**Ted Simpkins,** assistant mine foreman, Republic mine, Republic Steel Corp., Pikeville, Ky., for supervising an underground crew of 28 men for 1,777 days without a lost-time accident from March 19, 1944 to Jan. 1, 1952, a total of 351,985 man-hours.

**Leon Strecker,** outside foreman, Alaska colliery, Philadelphia & Reading Coal & Iron Co., Mt. Carmel, Pa., for having no lost-time accidents while supervising the outside colliery crew from July 14, 1948 to Feb. 29, 1952, a total of 396,109 man-hours.

**John W. Williams,** assistant foreman, Bethlehem Mines Corp., Fairmont, W. Va., for supervising a crew of 20 under-

## COMING MEETINGS

**Mine Inspectors' Institute of America: 42nd annual convention, June 9-11, Sterling Hotel, Wilkes-Barre, Pa. (Secretary, C. A. McDowell, 427 Park Ave., California, Pa.)**

**Mineral Producers' Association: annual meeting and dinner, June 12, Hotel William Penn, Pittsburgh, Pa.**

**West Virginia Coal Mining Institute and Central Appalachian Section, AIME: joint meeting, June 20-21, Prichard Hotel, Huntington, W. Va.**

**Indiana Coal Mining Institute: summer meeting, June 21, Terre Haute House, Terre Haute, Ind.**

**Stoker Manufacturers' Association: annual meeting, June 23-24, South Shore Inn, Lake Wawasee, Syracuse, Ind.**

**Open-Pit Mining Association, Electrical Div.: annual meeting, July 25, Electrical Engineering Bldg., Purdue University, West Lafayette, Ind.**

**Mining Electrical Group: Annual Exhibit, Aug. 21-23, West Frankfort Country Club, West Frankfort, Ill.**

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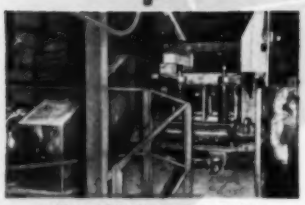
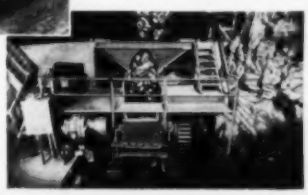


A 30" x 54" Rockmaster used for crushing rock from full seam mining.

# McLANAHAN *Single Roll* ROCKMASTER CRUSHER

A 60" McLanahan reciprocating feeder delivering limestone from 10 yard dragline to a 36" x 60" Rockmaster in a quarry in northwestern Ohio.



In both primary and secondary crushing the Rockmaster gives a minimum of fines and flats in this Iowa mine.

Outstanding for both primary and secondary crushing, the Rockmaster produces a minimum of flats, dust and irregular sizes. Self-feeding and equipped with automatic tramp iron protection and quick adjustment, it will take a choke feed without jamming. In operation, the material is held against the crushing plate while it is sledged by the wedge-shaped teeth of the roll until broken and forced through the crusher opening. Interchangeable and reversible crushing plates and quick-change steel segment rolls contribute greatly to economy in maintenance. The Rockmaster has been thoroughly service-proved on limestone, iron and manganese ores, gypsum, rock, gravel, shale, slag and other materials.

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ground employees without a fatality from Feb. 1, 1940 to Feb. 1, 1952, a total of 979,811 man-hours while producing 1,312,569 tons of coal.

**Certificates of Honor for exceptional safety records were awarded the following coal mines and mining companies:**

Bellingham Coal Mines, Inc.: Bellingham No. 1 mine.

Colorado Fuel & Iron Corp. and the following mines: Crested Butee, Frederick, Morley, and Rockvale No. 3.

Columbia-Geneva Steel Div., U. S. Steel Corp.: Columbia and Geneva mines.

St. Louis, Rocky Mountain & Pacific Co.: Koehler mine.

The Union Pacific Coal Co.: Reliance No. 1 mine, No. 11 seam, Reliance No. 7 mine, Stansbury mine, No. 1 seam, Stansbury No. 7½ seam and Winton No. 7½ mine.

Alabama By-Products Corp.: Barney, Bradford and Labuco mines.

Alabama Power Co.: Gorgas mine.

Black Diamond Coal Mining Co.: Black Diamond and Blockton No. 9 mines.

Tennessee Coal & Iron Div., U. S. Steel Co.: Hamilton and Short Creek mines.

Woodward Iron Co.: Mulga mine.

Amherst Coal Co.: Amherst 1A, 3A, 1B and 1C mines.

Bethlehem Mines Corp.: Mine No. 53.

Carbon Fuel Corp.: No. 9 mine.

Consolidation Coal Co. (W. Va.), Div. of Pittsburgh Consolidation Coal Co.: Mines Nos. 25, 32, 63 and 97.

Duquesne Light Co.: Harwick mine.

Coal Div., Eastern Gas & Fuel Associates: Carswell, Federal No. 1, Keystone, Kopperston No. 1, Stotesbury Nos. 8 and 11 mines.

Electro-Metallurgical Co.: Alloy No. 2 mine.

Gay Coal & Coke Co.: Nos. 2 and 3 mines.

Glen Alden Coal Co.: Baker colliery, Empire shaft, Kidder slope, Lance, South Wilkes-Barre, Truesdale and Woodward collieries.

Hatfield Campbell Creek Coal Co.: Pt. Lick No. 4 mine.

Island Creek Coal Co., Holden, W. Va., and the following mines: Nos. 1, 7, 20, 22, 24, 25, 26, 27 and 28 mines.

Lehigh Navigation Coal Co.: Lansford colliery.

Logan County Coal Corp.: Lundale mine.

Peabody Coal Co.: No. 14 mine.

Philadelphia and Reading Coal & Iron Co.: Locust Gap colliery, Locust Summit breaker, Newkirk and Oak Hill collieries, and Shen-Penn Production Co.

Pittsburgh Coal Co., Div. of Pittsburgh Consolidation Coal Co.: Mongah, Montour Nos. 4 and 10, and Renton Nos. 3 and 6 mines.

Pond Creek Colliery, N. & W. Fuel Dept., and: outside force, Pond Creek Colliery, and Thacker mine.

Pond Creek Pocahontas Co.: No. 3 mine.

Red Jacket Coal Corp.: company supervising officials and Coal Mountain No. 12 mine.

**Old Timers' Club Cites Penn State Senior**

**JOHN E. YOUNG,** senior in Mining Engineering at Pennsylvania State College, receiving the watch award of the Old Timers' Club from Maurice D. Cooper (left), director of mining-engineering education, National Coal Association, and secretary of the club. The presentation was made April 30 at a Mining Engineering Society banquet, at which C. W. Connor (right), Administrator, Defense Solid Fuels Administration, made the principal address.

Reitz Coal Co.: Reitz Nos. 3, Upper 3B, 4 and 5 mines.

Republic Steel Corp.: Clyde, Crescent No. 2 and Indianola mines.

Stonega Coke & Coal Co.: Imboden and Roda collieries and Roda No. 5 mine.

Truax-Traer Coal Co.: Shamrock Nos. 1 and 2 mines.

Union Colliery Co.: New Kathleen mine.

U. S. Steel Co.: No. 3 mine.

Westmoreland Coal Co.: Adams and Magee mines.

Westmoreland Mining Co.: Graff Nos. 1 and 2 mines.

West Virginia Coal & Coke Co.: Micco No. 3, Norton No. 2, Omar Nos. 4 and 5 and Stirrat No. 19 mines.

**Certificates of Honor were awarded to the following individuals for unusual records of working in or around coal mines without suffering a lost-time accident for the periods noted:**

William Anderson, EG&FA, Elkridge, W. Va., 44 yr; Clifton C. Bailey, Amonate, Va., 45 yr; William Barton, Pittsburgh Coal Co., Lawrence, Pa., 46 yr; Albert Lee Binion, Kayford, W. Va., 44 yr; James Brandon, EG&FA, Gallagher, W. Va., 48 yr; Ballard Clements, McComas, W. Va., from 1889 to 1947.

Edward F. Connelly, Oakmont, Pa., 42 yr; Herbert Cook, Reitz Coal Co., Central City, Pa., 68 yr and still employed; Thomas S. Cowie Sr., Rochester & Pittsburgh Coal Co., Creekside, Pa., 52 yr; John Cromer, Patton, Pa., 45 yr; Gilmer Dale, Philipi De Felice and Angelo Dominici, EG&FA, Maitland, W. Va., 41, 46 and 42 yr, respectively; Peter Dominick and Henry C. Gregory, Sterling Coal Co., Elmora, Pa., 42 and 44 yr, respectively; John B. Eaton, Oakmont, Pa., 47 yr; Joseph Lloyd Elkins, Oak Hill, W. Va., 50 yr.

Walter B. Fellabaum, Cheswick, Pa., 42 yr; Perry Gillespie, EG&FA, Kimball, W. Va., 41 yr; Solomon Gunther, Inland Steel Co., Wheelwright, Ky., 41 yr; Enoch Hall, Columbus Mining Co., Allais, Ky., 41 yr; George Hebner, Pittsburgh Coal Co., Lawrence, Pa., 51 yr; John W. Helton, Inland Steel Co., Wheelwright, Ky., 45 yr; Ira Jarrell, Uneeda, W. Va., 43 yr; James A. Jones, Consolidation Coal Co. (W. Va.), Owings, W. Va., 53 yr; S. E. Keesee, Eccles, W. Va., 50 yr.

Walter Curtis Kipp, Marmarville, Pa., 64 yr; John Kopera, Patton, Pa., 45 yr; Mike Kovach, Wilpen, Pa., 53 yr; Harry Harrison Krouse, Sprangler, Pa., 65½ yr to September, 1945. Albert Lang, EG&FA, Mt. Carbon, W. Va., 48 yr; William Lawton, Bluefield, W. Va., 55 yr; Marshall F. Leeper, EG&FA, Maitland, W. Va., 50 yr; C. B. Longworth, Columbus Mining Co., Allais, Ky., 53 yr and still employed as mine foreman; Isaac Mamoran, EG&FA, Eagle, W. Va., 47 yr; John Oley Mangus, Logan, W. Va., from 1898 to 1938; Nolan Bernard Mangus, Bossevain, Va., 50 yr.

John McDaniels, Stotesbury, W. Va., 1893 to 1948; Isadore J. Monborne, Revloc, Pa., 47 yr; A. C. Morris, Pittsburgh Coal Co., Smithdale, Pa., 51 yr; James A. Murphy, EG&FA, Kimball, W. Va., 50 yr; Bert Noonan, Bethlehem Mines Corp., Johnstown, Pa., 51 yr; Earnest Nuttall, Welch, W. Va., 45 yr, mostly in an official capacity; Roy J. Painter, Herminie, Pa., 42 yr; William B. Powell and Larkin C. Ramey, Princeton, W. Va., 47 and 54 yr, respectively; Joseph M. Roland, Oakwood, Va., 56 yr.

Steve Sebok, EG&FA, Weeksbury, Ky., 41 yr; Richard E. Shaw, Springdale, Pa., 51 yr; John W. Sigmon, Bluefield, W. Va., 51 yr; Mason Smith, EG&FA, Keystone, W. Va., 53 yr; Martin Sponsky, Sterling Coal Co., Elmora, Pa., 49 yr; George Stewart, Keystone, W. Va., from 1900 to 1945 for Peerless Coal & Coke Co.; John Thomas Stokes, Bethlehem Mines Corp., Patton, Pa., 51 yr; C. W. Stools, Eccles, W. Va., 54 yr.

Huey Elbert Stover, Clear Creek, W. Va., 45 yr; Will Swanson, Princeton, W. Va., 45 yr; Arthur Terry, EG&FA, Kimball, W. Va., 47 yr; Samuel R. Wakefield, Levale, W. Va., 48 yr; Gilbert Webb, Sprangler, Pa., 56 yr; Webster Wells, EG&FA, Kimberly, W. Va., 41 yr; Hollie West, Inland Steel Co., Wheelwright, Ky., 40 yr; James H. White, East Gulf, W. Va., 48 yr; A. G. Whited, Jewel Ridge, Va., 57 yr, from trapper to superintendent; R. L. Williamson, Goodwill, W. Va., 45 yr; John George Wilson, Patton, Pa., 49 yr; Joseph B. Wilson, Republic Steel Corp., Republic, Pa., 41 yr; Will Woods, EG&FA, Weeksbury, Ky., 44 yr; Edgar Wright, EG&FA, Keystone, W. Va., 51 yr; Nathaniel Wright, Bluefield, W. Va., 42 yr.

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# Personal Notes

## Love and Ireland Advance in Hanna Organization

**GEORGE H. LOVE** (left), president of Pittsburgh Consolidation Coal Co. since its formation in 1945, was named vice chairman of the board of directors of the M. A. Hanna Co. May 5. R. L. Ireland (right), chairman of the Pittsburgh Consol executive committee and a Hanna vice president and director, was made chairman of the Hanna executive committee. Mr. Love will continue to head Pittsburgh Consol, but is expected to devote a larger share of his time to Hanna affairs. Joseph H. Thompson, a vice president since 1937, was elected president of the M. A. Hanna Co., succeeding George M. Humphrey, who was advanced to chairman of the board.

### Costner Made Vice President

**T. E. COSTNER,** for the past 15 yr general superintendent of mines for the Sloss-Sheffield Iron & Steel Co., Birmingham, Ala., has been elected a vice president of the company. Mr. Costner attended Alabama Polytechnic Institute and joined the company in 1924 as a mining engineer. He also has served as mine foreman, superintendent and division superintendent. Fred Osborne, general superintendent in charge of manufacturing for the company, has been elected president.

Recent changes in the top echelon of The South-East Coal Co., Paintsville, Ky., include the following: **Alan J. Smith,** Merion, Pa., moves up from the presidency to become chairman of the board; **Harry LaViers,** Paintsville, formerly vice president and general manager, becomes president; and **Virgil D. Picklesimer,** Whitesburg, Ky., formerly general superintendent, becomes vice president-operations.

**R. H. Ross,** who has served Bethlehem Mines Corp. in various supervisory capacities since 1924 and who for the last 10 yr has been assistant superintendent, Johnstown Div., has been named division superintendent effective June 1, succeeding **George Roberts.** Mr. Roberts is retiring, having been in the coal-mining industry for 54 yr, the last 25 yr with Bethlehem.

**L. A. Billips,** engineer, Knoxville, Tenn., has been made a Kentucky colonel in recognition of his pioneering work in development of the coal fields of Harlan County, Ky. As division engineer for U. S. Coal & Coke Co., Mr. Billips helped plan and lay out the town of Lynch, Ky., seat of that company's operations, and was instrumental in building highways connecting towns of the Harlan field and nearby areas in Virginia.

**William A. Gallagher,** formerly assistant to the president, Westmoreland Coal Co. and Westmoreland, Inc., has been elected vice president of those organizations.

Blue Diamond Coal Co., Knoxville, Tenn., has issued a brochure celebrating the approaching half-century in the coal industry of **Alexander Bonnyman,** president of the company. The brochure notes that under Mr. Bonnyman's leadership for nearly 50 yr the company has developed 13 mines with combined capacity of over 7,000,000 tons per year. The publication also cites the 6-yr safety record of the company without a fatal accident.

**Herschel Creech** has been named to succeed **Has Collier** as mine foreman, Hendrix mine, Consolidation Coal Co. (Ky.), Jenkins, Ky. Mr. Collier soon will be assigned to another mine of the company, the announcement said.

**Gordon G. Bonnyman** has been made general manager of mines, Blue Diamond Coal Co., Knoxville, Tenn., succeeding **Charles B. Jackson,** who has retired because of ill health.

**John A. Barnott,** tipple foreman, Weeksbury mine, EG&FA, Weeksbury, Ky., retired last month after 36 yr at the mine. He was first employed there in 1916 by the Elkhorn Gas & Coal Co., former operators of the property. Under the EG&FA employee retirement plan, Mr. Barnott receives a life-long income.

Two Pennsylvania students in mining engineering cited by the Old Timers' Club as outstanding 1952 graduates have become associated with the engineering staff of the Johnstown Coal & Coke Co., Johnstown, Pa. **Robert S. Bakale,** a February graduate of the University of Pittsburgh, now is with the engineering staff of the company's Portage, Pa., mines. Mr. Bakale, son of a company employee, was working for the company when he received one of its scholarships in 1948. **Stephen J. Latanision,** of Forrest City, is to join Johnstown Coal & Coke on his graduation from Lehigh June 16.

## Association Activities

**Ohio Coal Association** at its annual meeting April 25 at Cleveland elected the following officers: W. D. Hamilton, president and chairman of the board; P. C. Beutel, vice president; Ezra Van Horn, executive vice president; E. H. Miller, secretary-treasurer; and Anna Lucht, assistant secretary-assistant treasurer. The association also named the following directors: E. H. Davis, P. C. Beutel, W. D. Hamilton, R. L. Ireland, S. B. Johnson, George M. Jones Jr., Merl C. Kelce, Whitney Warner Jr. and Harold E. Turner.

**Pennsylvania State Bituminous Safety Association** elected W. Garfield Thomas, Pennsylvania deputy secretary of mines, president of the association at a meeting May 2 at Ebensburg. Other officers elected are: vice president—W. A. Morris, safety director, Baton Coal Co.; secretary—George P. Resick, state mine inspector; and treasurer—M. L. Coulter, Indiana, Pa.

**Association of Mining Personnel Officers,** a newly organized group, named the following officers at a meeting April 24 at

# guardian genie of MINING CABLE

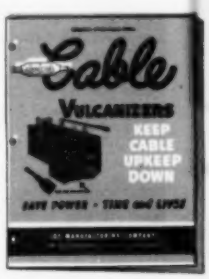
# JOY STEAM HEATED VULCANIZERS

*Illustrated above is a typical rejacketing job on a cable splice made with a JOY Vulcanizer and a type "B" Mold.*

**MOLDS AND SUPPLIES** . . . JOY has them all. Each carefully designed or compounded to help you make professional *on-the-job* repairs of electrical cable jacketing. Bulletin RV106 (at right) describes this material and provides valuable operating recommendations.

If there is a kindly spirit that looks out for mining equipment, JOY Cable Vulcanizers certainly rate among its best tools. Every year since their introduction in 1928, they've been more widely used for cable conservation. Today, with replacement cable often difficult to obtain—and with proper on-the-job repairs therefore multiplied in importance—JOY Vulcanizers really are the *guardian* of portable power lines.

Why take chances with cold-taped splices when *permanent* repairs can be made so easily and economically with JOY's proved method of cable maintenance? ● You'll want to know how our 1952 units are being used to help maintain high mining production schedules in spite of cable shortages. *Ask for a full description of the many advantages of hot vulcanization today!*




**YOURS FOR THE ASKING** . . . A copy of this attractive 16-page bulletin covering JOY Steam and Direct Heat-type Vulcanizers, Molds and Supplies has been reserved for you. *Write for it now.*

*Consult a Joy Engineer*

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## JOY MANUFACTURING COMPANY

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IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

Mt. Hope, W. Va.: president, Luther T. Powers, Beckley; vice presidents, C. M. Brown and Maurice Ellis, both of Omar; secretary, W. B. Poling, Mt. Hope; and treasurer, W. H. Henritze, Bartley.

## Obituaries

**W. M. Ritter,** 88, widely known in lumber and coal industries, died May 21 at his home in Washington, D. C., after a 4-yr illness. Mr. Ritter was a founder of the W. M. Ritter Lumber Co., the Red Jacket Coal Corp. and associated organizations. Mr. Ritter's gift in 1924 of $3,000,000 worth of stock to employees as a reward for loyalty and hard work was praised by President Calvin Coolidge as a forward step in employee relations.

**George D. Wyant,** 59, superintendent of the Indianola mine, Republic Steel Corp., Indianola, Pa., died May 15.

**William B. Dunham,** 53, mine manager, No. 5 mine, Panther Creek Mines, Inc., Springfield, Ill., collapsed while at work May 9 and died while enroute to a hospital. Mr. Dunham had worked in coal mines in the area for 35 yr and had become mine manager at No. 5 last year.

**Penn State Honors Alumni**

**GEORGE H. DEIKE** (left), one of the five prominent alumni chosen by the Pennsylvania State College Board of Trustees for distinguished achievement, receives a special medallion and scroll from the college president, Milton S. Eisenhower, during a special Honors Day program. Similarly honored were John J. Forbes, Class of 1911, director of the USBM; and Lewis E. Young, 1900, former operating vice president of the Pittsburgh Coal Co., and now a consultant in the field. Mr. Deike, Class of 1903, is president, treasurer and director of Mine Safety Appliances Co.

# New Mine Developments

### Berwind-White Plans Cleaning Plant at $1.7 Million Cost

The Berwind-White Coal Mining Co., Windber, Pa., reportedly is planning construction of a new cleaning plant at its Maryland No. 2 mine, Wilmore, Somerset County, Pa. A $1.7 million cost is estimated for the new facility, which is expected to be in operation in 1953. Capacity of the tipple and cleaning plant will be 3,500 tpd.

### Little John to Develop Illinois Strip Mine

The Little John Coal Co., Indianapolis, has announced plans for a new strip mine near Stonefort, Ill., on property lying across the Williamson and Saline County line. Mining will be carried on by Stonefort, Inc., Chicago, a newly formed subsidiary, and some 100 to 150 men will be employed. Actual development is not expected to start until sometime next year. The company is understood to have 3,000 acres available in the area.

### Peabody Issues $15,000,000 In New Mortgage Bonds

Peabody Coal Co. April 22 issued $15,000,000 of 20-yr first-mortgage sinking-fund bonds. The company planned to use $10,720,000 of the proceeds to retire similar bonds due in 1962 and the other $4,280,000 to reimburse itself for expenditures for capital additions made or to be made out of its treasury, according to Stuyvesant Peabody Jr, president. In commenting on the extensive mine development and modernization program undertaken since 1947, Mr. Peabody reported that the company and its subsidiaries, the American Eagle Colliery and Great Heart Coal Co., own or have under lease coal lands containing over 1 billion tons of recoverable coal. Of the total estimated as of last Jan. 31, 989,178,599 tons was owned and 56,782,258 tons was leased. As soon as practicable, Mr. Peabody said, the company intends to begin construction of Mine No. 11, 2½ mi north of Taylorville, Ill. Expected to begin commercial operation in the latter part of 1953, this new property will be similar to Mine No. 10, which will have a capacity of 13,200 tons per double-shift day when it is ready for commercial output this August.

**B. G. Powell** has sold the Coal Creek Coal Co. mine at Wellington, Utah, to the Eastern Utah Coal Co., Price, Utah, headed by Otto Reichert, president. Operating under the name of Midwest Coal Sales, 202 Beason Bldg., Salt Lake City, Mr. Powell is handling coal sales for Eastern Utah and the Sevier Valley Coal Co.

**Orient No. 2 mine** of the Chicago, Wilmington & Franklin Coal Co. re-opened May 12, operating on a reduced-tonnage basis.

**The Trojan mine** of the Maryland Trojan Coal Co., Glen Campbell, Pa., closed since March 27, has been taken over by the Western Bituminous Mining Co., Shamokin, Pa. Fred E. Lark, of Shamokin, heads Western Bituminous Mining and Charles E. Pennington, with Maryland Trojan for 12 yr, is general superintendent of the new firm.

**The Powhatan Mining Co.** plans construction of a new coal-barge loading dock at Dilles Bottom, on the Ohio River a few miles upstream from Powhatan Point, Ohio. The dock, which will be built by the Contracting Div. of the Dravo Corp., will facilitate loading river barges with coal from nearby mines for transportation to users and rail transfer points.

**In Pennsylvania,** the Greensburg & Scottdale Fuel Co., Scottdale, Pa., is now operating the Mt. Grey mine, formerly operated by the Loyalhanna Fuel Co. The Maher Coal & Coke Co. has leased its Maher mine to the Leechburg Mining Co., Leechburg, Pa.

**The Raven Red Ash Coal Co.,** Beckley, W. Va., reportedly closed its No. 2 mine, Raven, Va., last month because of economic conditions. The property, which was originally opened early in the century, has been employing about 300 men and producing 1,000 tpd of a high-grade domestic coal.

**The Kay-Jay** mine of the Kentucky-Jellico Coal Co., Kayjay, Ky., reportedly was closed during April as a result of uneconomical operating and market conditions. The mine had a capacity of 1,250 tpd and employed several hundred miners.

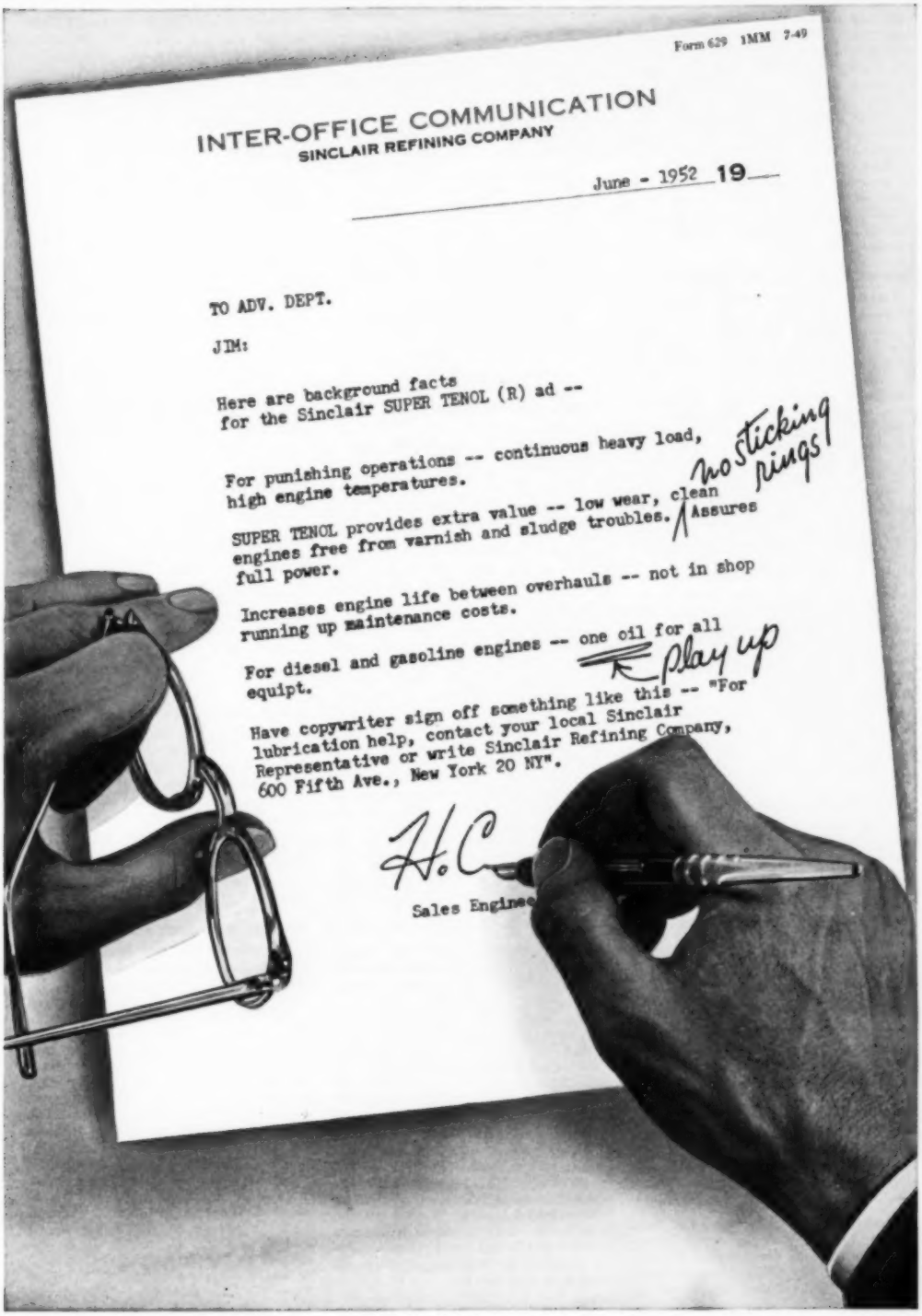
## New Books for Coal Men

### The Engineering Profession

**Engineers and Ivory Towers,** by Hardy Cross, edited by Robert C. Goodpasture. In this one, the crystal-clear views of Mr. Cross, eminent engineer and educator, concerning the specifications of the engineering profession and how engineers should be educated, are provocative to say the least. Mr. Cross holds that too many people in specialized fields are styling themselves as engineers . . . "to give the impression that they deal with measurable data from which definite laws useful to mankind can be deduced." On the matter of education, Mr. Cross resents the inclusion of the survey-type course in engineering curricula. In reading the book, it's difficult to be neutral. *141 pp; cloth. $3, McGraw-Hill Publishing Co., 330 West 42nd St., New York 36, N. Y.*

### Recovering Pillar Coal

**Mechanical Mining in Some Bituminous-Coal Mines—Progress Report 6: Extraction of Pillars With Mechanized Equipment,** by W. A. Haley, J. J. Shields, A. L. Toenges and L. A. Turnbull. Recovery of coal in mines where pillars are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For punishing operations -- continuous heavy load, high engine temperatures.
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extracted mechanically runs 10 to 50% more than where pillars are not extracted. Best results are obtained with the open-end method and with advance planning of both development and extraction. Though more labor is used in pillar extraction, the higher percentage of coal recovered from a given area means a smaller initial investment and a lower tax cost per ton mined. This report, one of a series, describes and discusses 12 mines. *USBM, I.C. 7631. 63 pp. 8 x 10¾-in.; paper; mimeo. Free, Publications Distribution Section, 4800 Forbes St., Pittsburgh 13.*

### Better Shooting for Safety

**Hazard of Firing Open Unconfined Shots in Coal Mines,** by M. J. Ankeny. Even permissible explosives can ignite gas or coal dust if fired as mudcap, adobe or bulldozing shots. This report describes six major explosion disasters caused by firing open shots. It suggests four simple preventive measures: (1) using only permissible explosives; (2) inserting all charges in boreholes; (3) stemming all charged holes with incombustible material; and (4) firing electrically with permissible firing units. *USBM, I.C. 7632. 8 x 10¾-in; paper; mimeo. Free, Publications Distribution Section, 4800 Forbes St., Pittsburgh 13.*

### Help for Mining Students

**Science for Coal-Mining Students,** by H. and D. S. Morton. Two authors, one a mining-school science teacher and the other a practical expert in coal mining, pooled their skills for this book. Though geared to British mines, it may be useful in the United States as well. There are 21 chapters dealing with mining problems, especially from the physical standpoint. *250 pp. 5¾ x 9¾-in; boards. 21 shillings ($3), The Technical Press, Ltd., Gloucester Rd., Kingston Hill, Surrey.*

### Other Books & Booklets

**Castleman Basin, Garrett County, Maryland, Coal Beds in Central Part; Reserves; Petrographic and Chemical Characteristics of Coals; Stratigraphy of Area,** by A. L. Toenges, Lloyd Williams, L. A. Turnbull, B. C. Parks, H. J. O'Donnell, R. F. Abernethy, W. H. Ode and Karl Waage. *USBM, Bulletin 507. $4.50, Supt. of Documents, Govt. Printing Office, Washington 25, D. C.*

## Preparation Facilities

**Philadelphia & Reading Coal & Iron Co., Locust Summit plant, Locust Summit, Pa.**—Contract closed with Denver Equipment Co. for 24 additional No. 30 Denver "Sub-A" Lasseter-type coal-flotation machines to double capacity of existing froth-flotation plant recovering plus 28-mesh from breaker water and slush dams at an approximate rate of 120 tph.

**Pennsylvania Water & Power Co., Safe Harbor, Pa.**—Contract closed with Western Machinery Co. for design and erection of coal-preparation plant to treat 194 tph of dredged river silt containing anthracite fines, including dock-unloading facilities; to produce 100 tph of clean coal by tabling and froth flotation, with approximately 60% of feed handled by flotation.

**Lynnville Coal Co., Lynnville mine, Linnville, Ind.**—Contract closed with McNally Pittsburg Mfg. Corp. for complete 3-track preparation and cleaning plant with R-O-M input of 500 tph; R-O-M broken to 6 x 0 prescreened at 1½ in, with 6 x 1½ washed in one McNally Norton automatic washer and 1½ x 0 cleaned in 6-cell McNally Norton automatic washer together with rewash of crushed middlings from coarse-coal box; crushing facilities to reduce all plus 1½ to 1½ x 0; 1½ x 0 screened at ⅜-in. with ⅜ x 0 centrifugally dried and 1½ x ⅜ washed coal thermally dried in a McNally Vissac down-draft drier; provision made for classifying and loading out any of the following sizes: 6 x 4, 4 x 1½, 6 x 1½, 1½ x ⅜ and ⅜ x 0.

**Midwest Utilities Coal Corp., Sparta, Ill.**—Contract closed with McNally Pittsburg Mfg. Corp. for complete 4-track preparation and cleaning plant with R-O-M input of 250 tph; 7 x 0 raw coal from underground conveyor system to be washed in one No. 4 5-cell McNally Norton automatic washer; middlings from main wash box to be crushed and rewashed in a No. 1 McNally Norton rewash unit; washed coal classified as 7 x 4, 4 x 1¼, 1¼ x ¾ and ¾ x 0; ¾ x 0 to be dewatered on vibrating-type dewatering screens and separated into ¾ x ⅜ and ⅜ x 0 fractions; ⅜ x 0 centrifugally dewatered in a McNally Carpenter centrifuge; crushing facilities to crush all plus ¾ to ¾ x 0, with rescreening facilities to generate ¾ x ¼ and ¼ x 0; complete mixing facilities for selective loading and mixing on four tracks.

**Yokoyama Engineering Co., Japan**—Contract closed with Southwestern Engineering Co. for service related to installation of a heavy-media plant for coal separation, with much of the equipment and structures to be built in Japan under supervision of the Southwestern Engineering technical staff.

### EQUIPMENT APPROVALS

**Six approvals of permissible equipment were issued by the U. S. Bureau of Mines in April, as follows:**

**Brown-Fayro Co.—Type LaBour mine pump; one 3-hp motor, 550 v, DC; Approval 2-690A; April 15.**

**Joy Mfg. Co.—Types RBD-1 and 6 drills; one 15-hp motor, 220/380/440/500 v, AC; Approvals 2-850 and 2-850A; April 3.**

**Joy Mfg. Co.—Type 18HR-2F hard-rock loader; one 75-hp, two 7½-hp and one 4-hp motors, 500 v, DC; Approval 2-851A; April 8.**

**Joy Mfg. Co.—Type 42D18P battery-operated shuttle car; three 7½-hp motors, 90 v, DC; Approval 2-852; April 24.**

**Goodman Mfg. Co.—Type 53 Timberman; one 10-hp motor, 220 v, AC; Approval 2-853; April 29.**

**Joy Mfg. Co.—Type AD2 auger drill; one 40-hp motor, 250 and 500 v, DC; Approvals 2-854 and 2-854A; April 30.**

### Fishing Contest Renewed

The Missouri Coal Operators' Association has announced prizes and rules for the 1952 strip-pit fishing contest, third in a series that started in 1950. Top prize will be a 5-hp Mercury outboard motor. In addition, there are 12 choice prizes and 100 other awards. A duplicate set of prizes is offered for coal-company employees and the general public. The contest requires no entry fee. All fish entered must be caught in strip-pit waters. Awards are offered for black bass, crappie and pan fish. Unlike earlier rules, this year's rules permit use of live bait as well as lures. Further information may be obtained from Jack E. Bernet, Sinclair Coal Co., 114 West 11th St., Kansas City, Mo.

### To Fight Mine Fires

The House of Representatives in Washington has unanimously passed and sent to the Senate a bill authorizing a permanent mine-fire control program within the Bureau of Mines. The bill authorizes $500,000 per year for the program. The bill provides that towns and states no longer would be required to match federal funds for fighting mine fires. Federal funds could not be used, however, for fighting fires in privately-owned active mines.

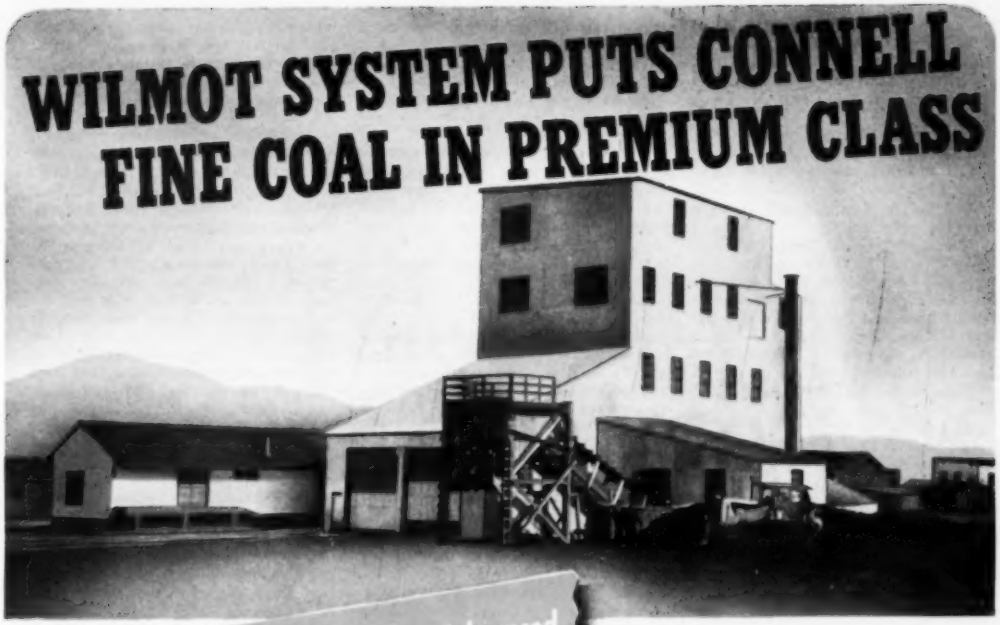
### Atom Power No Threat

Atomic power is no immediate threat to coal, says Gordon Dean, chairman, Atomic Energy Commission. Mr. Dean expressed his views in a recent radio interview with Senator Kilgore, of West Virginia. "Atomic energy will tend to supplement rather than to supplant our traditional sources of fuel supply, for at least as long as the traditional fuels are available at relatively low cost," Mr. Dean said.

### Gordon Research Meet Set

The second Gordon Research Conference on coal will be held at New Hampton School, New Hampton, N. H., Aug. 25-29. Set up to stimulate research in universities, foundations and private and government laboratories, the conference will cover combustion and gasification reactions with special emphasis on chemical kinetics and mechanisms, properties and reactions of coal ash, and X-ray studies of coal and carbon. The committee for the conference includes G. D. Creelman, The M. A. Hanna Co.; Dr. A. C. Fieldner, USBM; N. K. Chaney, American Gas Association; J. F. Foster, Battelle Memorial Institute; and H. C. Howard, Carnegie Institute of Technology. Attendance at the conference is limited to 100. Inquiries should be addressed to Dr. W. G. Parks, University of Rhode Island, Kingston, R. I., up to June 15; after that date, Colby Junior College, New London, N. H.

# WILMOT SYSTEM PUTS CONNELL FINE COAL IN PREMIUM CLASS



## New 1500-Ton Plant Introduces Advanced Engineering Features: Sets New Efficiency Standards. Special Problems Solved.

Using an old silt basin for feed, Connell Coal Company's new ultra-mechanized fine coal plant is meeting such superior specifications that its entire production of Buck No. 3, No. 4 and No. 5 sizes sells at premium prices. This is another demonstration of the profitableness of the Wilmot Fine Coal Recovery System.

The Connell plant at Beaver Meadows, Pa., was a completely engineered project. The Wilmot System is standard to the extent that it combines Wilmot Hydrotators and Froth-flotation Classifier to give a complete automatic cleaning method. Otherwise the system was adapted to the specific problems of this operation. Let us tell you of other plants where you can see Wilmot's automatic low-cost system of fine coal recovery in operation.

*Bulletin on Coal Cleaning Equipment*
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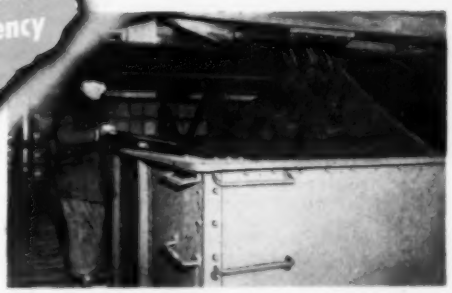
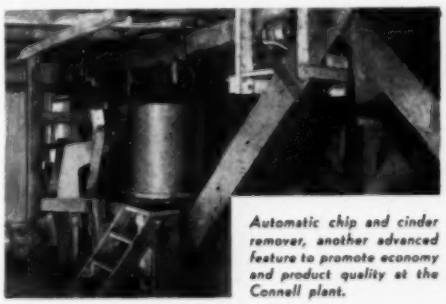


*Loading No. 5 coal. To eliminate fine coal losses, even railroad car drainage is returned into the closed water circuit.*



*Automatic chip and cinder remover, another advanced feature to promote economy and product quality at the Connell plant.*

**WILMOT ENGINEERING CO.** HAZLETON, PA. *Plant:* WHITE HAVEN, PA.

**Bluefield Coal Show Report . . . Begins on p 112**

tor with dozer, Caterpillar 212 motor grader.

**Caterpillar Tractor Co.**, Peoria, Ill.—D318 100-hp and D375 335-hp diesel engines, D6 tractor with dozer, 212 motor grader.

**Charleston Electric Supply Co.**, Charleston, W. Va. — Allis-Chalmers pumps, Anaconda wire and cable, Deming pumps, Goodyear conveyor belts, Ohio Brass line material and motor starters, Prox cutter chains.

**Chicago Pneumatic Tool Co.**, New York—Type RBD-30 roof-bolting unit, new RBD-18 roof-bolting unit with rubber tires for conveyor mining, new hydraulic hand-held coal drill, Models 571 and 572 permissible hand-held electric coal drills, electric saw, pneumatic-impact roof-bolt wrenches.

**Clarkson Mfg. Co.**, Nashville, Ill.—Redbird loaders and Redbird Uni-Flight chain sections.

**Construction Machinery Co.**, Waterloo, Iowa—Concrete mixers.

**The Crichton Co.**, Johnstown, Pa.—Crichton wet and dry roof-pinning drills, Crichton flexible-shaft coal drill, Gayco neoprene protective coating.

**Cummins Diesel Sales & Service**, Charleston, W. Va.—Model NHRIS-600 diesel engine developing 300-hp at 2,100 rpm.

**Deming Co.**, Salem, Ohio—Deming pumps and water systems.

**Joseph Dixon Crucible Co.**, Jersey City, N. J.—New all-purpose interior and exterior enamel for wood, concrete and steel, graphite paints and graphited oils and greases, including trolley lubricant and special ball- and roller-bearing grease.

**Dodge Mfg. Corp.**, Mishawaka, Ind.—New Tri-Matic overload release for use with Dodge Torque-Arm speed reducer, Taper-Lock steel conveyor pulleys and V-belt drives.

**Duff-Norton Mfg. Co.**, Pittsburgh—Complete line of mechanical and hydraulic lifting jacks, including mine-roof timbering jacks, ratchet-lowering jacks, independent-pump hydraulic jacks, cable-reel jacks.

**E. I. du Pont de Nemours Co., Inc.**, Wilmington, Del.—Dupont line of paints, including new Flow-Kote rubber-base paint and new du Pont Sealer-Coater which dries in 2 hr on new work and permits following with second coat immediately.

**Duquesne Mine Supply Co.**, Pittsburgh—Trolley and feeder material and rail and track equipment, including the following new items: DuKane patented hanger clamp for supporting trolley wire as a single unit to replace bell-and-clamp type, fused stringer nip that reportedly can't blow up, smooth underrun sectional switch mounted on bakelite, shrouded trolley-wire slide for protection against rock dust, new Redipt car stop for low mine cars, mine-car pin with section beneath flange to prevent its coming out of hitching and Redipt cutter-arm snatch block with an unusual safety feature.

**Electric Controller & Mfg. Co.**, Cleveland—New mine sectionalizer incorporating an automatic reclosing feature using the Neo-Timer.

**Electrical Distributors Co.**, Philadelphia—Fault finder.

**Elliott Service Co.**, Mt. Vernon, N. Y.—Management-training services for coal mining.

**Elreco Corp.**, Cincinnati—Elreco roof-bolt expansion units, trolley line and feeder material, including a new type S-U trolley-wire splicer designed to minimize arcing and wear, and new Types D and H trolley hasp and shoe with a feature reducing tilting and arcing to a minimum.

**Ensign Electric & Mfg. Co.**, Huntington, W. Va.—Ensign 6320 AC explosion-tested starter, KKG permissible distribution box, 3G open 380-v 50-cycle 3-phase distribution box, open shuttle-car distribution box, cable line connectors, centrifugal switch for underground belt conveyors, explosion-tested push button, and the new Ensign-Clark ADJR reversible starter for 2-speed motor operation for underground belts.

**Enterprise Wheel & Car Corp.**, Bristol, Va.—Six-ton drop-bottom mine car.

**Esso Standard Oil Co., West Virginia Div.**, Charleston, W. Va.—Industrial lubricants and coal-treating oils.

**Farmers Engineering & Mfg. Co.**, Pittsburgh—Femco trolley phones, Femco tipple amplifier, Femco 1 to 10 permissible shot firer, new Femco cable fault finder, Super-Page intercommunicating system.

**Firth Sterling Steel & Carbide Corp.**, Pittsburgh—Firthite auger, finger and machine bits and accessories, including new DV bit needing less feed pressure for hand-held drills.

**Flexible Steel Lacing Co.**, Chicago—Flexco HD belt fasteners, Flexco No. 500 hinged belt fasteners, Alligator belt cutters, Alligator V-belt fasteners.

**Foote Bros. Gear & Machine Corp.**, Chicago—Maxi-Power speed reducers, Hygrade worm-gear reducers and Foote-Louis Allis gearmotors.

**Gardner-Denver Co.**, Quincy, Ill.—Model WB 2-stage air compressor for underground use in roof bolting, vertical-tank 2-stage air compressor, 5-cylinder radial-piston-type air motor available in 3- to 15-hp sizes, Model S-48 hand-held drill weighing 48 lb and featuring simplified changeover from wet to dry drilling, or vice versa, without necessity of taking machine apart; air-operated VP4 sump pump, new lightweight B37 paving breaker using standard 1-in hex steel, B67 paving breaker, LO-12 automatic line oiler, and Model 2-in BA centrifugal pump.

**Gates Rubber Co.**, Denver, Colo.—Mechanical rubber goods for the mining industry, including V-belts, industrial hose and rubber face plates for protection against abrasion.

**General Cable Co.**, New York—Safety "Mineral-Insulated" wire and cable.

**General Electric Co.**, Schenectady, N. Y.—GE motors, controls, feeder and line material, wire and cable, renewal parts for motors and controls, AK family of hook-on meters, GE lamps and rough-service sealed-beam lamps for mine use, and the following new items: CR7092 motor-control center featuring new GE across-the-line starter and unusual compactness, versatility and flexibility; 4CA2-A1 and -A2 carrier-current battery-powered mine communication equipment for application between moving units and/or stationary stations; Permafil-treated coils featuring permanent bonding, oil-water-acid resistance, better heat dissipation and high mechanical strength; CY-38 cable-reel motor operating at low temperatures and speeds with high reel torque; renewable fuse with silver contacts for eliminating high resistance and new time-delay link for more effective interrupting characteristics; GE L-69 high-powered unbreakable floodlight for high-bay and outside lighting; and R-52 400-w mercury-arc and 500- and 750-w incandescent lamps for tipple and shop lighting.

**Goodman Mfg. Co.**, Chicago—New L-14 shaker drive, 20½ in high and 46 in wide, over-all, powered by a 15-hp motor and featuring unusual compactness, a built in winch for moving the drive and other equipment, and new-type gearing simplifying construction, eliminating parts and providing superior shaker action, plus a 20-ton hydraulic jack for shaker equipment, sealed-beam headlights and sealed-beam kits, bridge-type cutter chain and Camtactor controller.

**B. F. Goodrich Co.**, Akron, Ohio—Belting, hose and other industrial rubber products.

**Gorman-Rupp Co.**, Mansfield, Ohio—Gorman-Rupp self-priming mine pumps, Gorman-Rupp Alta pumps.

**Grafton Coal Co.**, Clarksburg, W. Va.—New Compton Giant Model 42 coal auger, drilling 189-ft-long holes.

**Greene, Tweed & Co.**, No. Wales, Pa.—Palmetto mechanical packing, soft-faced hammers and mallets, reversible ratchet wrenches.

**Gulf Oil Corp.**, Pittsburgh—Mining lubricants, featuring Gulf Mining Machine Lubricant B.

**Guyan Machinery Co.**, Logan, W. Va.—Guyan resistors for locomotives, loaders, cutters, etc.; manually operated and automatic motor starters, bond welders, headlights and light switches.

**Harris Pump & Supply Co.**, Charleston, W. Va.—Marlow mine gathering pumps.

**Hendrick Mfg. Co.**, Carbondale, Pa.—Perforated steel screen plates, Mitco open steel floor gratings, new Hendrick 10A and 15A Wedge-Slot dewatering screen.

**Hewitt-Robins, Inc.**, Stamford, Conn.—Eliptex 3x12-ft dewaterizer, Rubberlokt wire-wheel brush in both carbon and stainless steel wires for cleaning stainless steels, and new demountable intermediate deck section for mining conveyors equipped with 2¼-in offset idlers, 4-in troughing idlers, 4-in Rubberdise cushion idlers.

**Huntington Supply & Equipment Co.**, Huntington, W. Va.—American Abrasive brake shoes, Tool Steel gears and pinions; Cincinnati cutter chains, bars and bits; Nolan re-railers and Porta-Feeder.

**Ideal Industries, Inc.**, Sycamore, Ill.—

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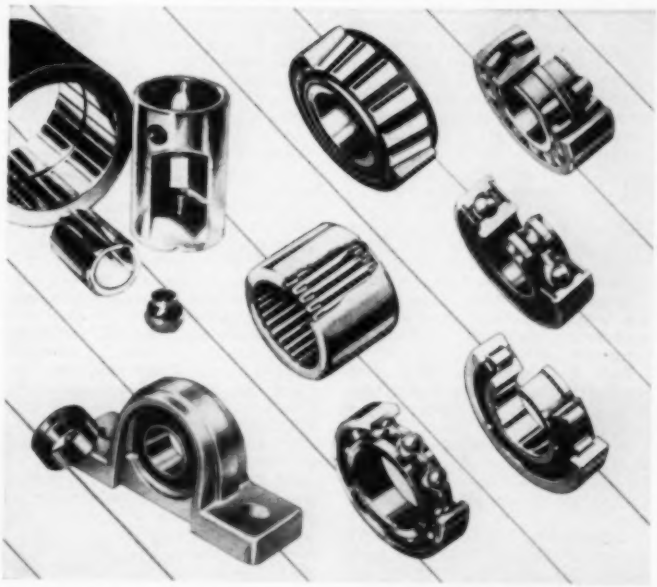

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**INDIANA BEARINGS, INC.**
801 N. Capitol Avenue • INDIANAPOLIS 4, IND.

**TENNESSEE BEARINGS, INC.**
417 Dale Avenue • KNOXVILLE, TENNESSEE

**Bluefield Coal Show Report . . . Begins on p 112**

Electrical testing and maintenance tools, including new flexible "abrasive-in-rubber" for "scouring" commutators and contactor members, and new Ideal Blo-R-Vac tank which is easily attached to a conventional-type blower to make a tank-type industrial cleaner.

**Industrial Products Corp.**, Pittsburgh—Ware Hi-Lag renewal fuses.

**Ingersoll-Rand Co.**, New York—New 2CRUNP self-priming centrifugal pumps available in all bronzes for acid mine waters, RP38 short-leg stoper for roof pinning, improved 50-B Type air-cooled compressor for operating two stopers underground, Carset bits and electric Impactools.

**I-T-E Circuit Breaker Co.**, Philadelphia—KSC Class 2-4 stub multiple-feed sectionalizing breaker incorporating new voltage differential relay which automatically selects between stub- and multiple-feed applications; load-distribution relay for motor generators and rotary converters.

**Jeffrey Mfg. Co.**, Columbus, Ohio—Aerodyne Jr. 4-ft fan, 4-motor Type C-58-B locomotive controller Type CSS locomotive resistance, slack-handling device for 35BB undercutter, underground conveyor chains, new A-7 permissible hand-held electric coal drill with increased auger speed of 939 rpm, idlers, and pillow blocks and take-ups, including rubber-covered impact-absorbing idlers and idlers with self-aligning spool return to prevent material packing on belt.

**R. P. Johnson**, Wytheville, Va.—De Walt and Delta wood-working tools, Simmonds saws, McCulloch chain saws, Wahlstrom chucks, Foat-Lock vises.

**Johns-Manville Sales Corp.**, New York—Transite pipe, JM brake blocks and linings, industrial packings, panelboard and arc-deflecting material, plastic-sealing compound.

**Jones & Laughlin Steel Corp.**, Pittsburgh—Otiscoloy low-alloy high-strength steel, Jalloy mining abrasive-resistant steel, Precisionbilt wire ropes.

**Joy Mfg. Co.**, Pittsburgh—Rotary hydraulic self-propelled roof-bolting drill, percussion roof-bolting drill, cable connectors, Sulmet bits, safety circuit centers.

**Kanawha Mfg. Co.**, Charleston, W. Va.—Kanawha-Belnap calcium-chloride washer, preparation equipment and services.

**W. R. Keesee & Co., Inc.**, Bluefield, W. Va.—Dodge Job-Rated trucks.

**Kennametal, Inc.**, Latrobe, Pa.—New Style UR cutter bit for resistance to shock, new Style DL auger bit for faster drilling of hard brittle coal, new Style HFD roof drill bit, and rock bits, roof pinning rods and overburden bits.

**Kersey Mfg. Co.**, Bluefield, W. Va.—Three-ton rail locomotive 20 in high, Model 444 4-wheel drive 4-wheel steer rubber-tired tractor, All-Steer Tug rubber-tired tractor, 3-wheel, 24 in high; Lo-Jo rubber-tired tractor, 3-wheel, 20 in high; track locomotive, 3-ton, 27 in high, all battery powered.

**Koppers Co., Inc.**, Pittsburgh—Pressure-treated wood for mining.

**Kuhlman Electric Co.**, Bay City, Mich.—Transformers.

**A. Leschen & Sons Rope Co.**, St. Louis—Hercules Red Strand wire ropes for mining service.

**Linde Air Products Co.**, New York—Oxweld cutting and welding equipment, Sigma inert gas welding for fabricating ferrous and non-ferrous metals.

**Link-Belt Co., Chicago**—CA2514 Concentric-Action 5x14-ft vibrating screen with new-type floor mounting, Link-Belt car shaker, chains, belt idlers, herringbone speed reducer powered by Electro-fluid drive, and P.I.V. drive connected to worm-gear speed reducer.

**Long Super Mine Car Co.**, Oak Hill, W. Va.—Piggyback conveyors, room and gathering conveyors, Superflite conveyor chains.

**Marathon Bit Co.**, Montgomery, W. Va.—Mining machine bits, 14-BU loader motor mountings, drill press clamp, portable internal grinder, replacement parts.

**Marion Handle Mills, Inc.**, Marion, Va.—Mountain Hickory tool handles for hammers, axes, picks, etc.

**Marshall Equipment Co., Inc.**, Huntington, W. Va.—Selectro vibrating screen, Mining Machine Parts replacement parts, Pennsylvania Electric Coil Corp. coils, Sterling Steel mine-car wheels, John Flocker plastic and jute brattice cloths, Precision cutter chains.

**Master Vibrator Co.**, Dayton, Ohio—Master generator for construction-job lighting.

**May Office Service**, Beckley, W. Va.—Office supplies.

**McLanahan & Stone Corp.**, Hollidaysburg, Pa.—New 24x36-in Bantam single-roll coal crusher featuring the new exclusive hydraulic tramp-iron protection and quick adjustment.

**Mine Safety Appliances Co.**, Pittsburgh—New plug for W-8 and E-2 methane detectors, new 10-shot blaster, new dust collector for rotary and percussion roof-bolt drilling and general rock drilling, Minephone, Edison R4 cap lamps, Pneolator for automatic artificial respiration, Chemox oxygen-breathing apparatus featuring the demand-oxygen unit, Junior-model Wolf safety lamp, Velocity power tools, first-aid materials, goggles, gas masks and self rescuers.

**Minnesota Mining & Mfg. Co.**, St. Paul, Minn.—New Scotch No. 33 plastic electric tape designed to replace rubber and friction tape as stronger and oil- and moistureproof; Scotch Filament tape No. 880 made of glass fibers and said to be as strong as steel banding tape for wrapping heavy packages; and masking, cellophane and sound-recording tape.

**Mosebach Electric & Supply Co.**, Pittsburgh—Trolley and line material, resistances and resistance welders, including new clamp-type trolley tap, brake adjuster and cable stubber.

**National Electric Coil Co.**, Columbus, Ohio—Coils and insulating materials, rewinding service.

**National Mine Service Co.**, Beckley, W. Va.—New Wheat Model 596 selenium rectifier for cap-lamp charging, New Gates Neo-Clad neoprene coating for belt repairs and coating pump impellers, Wheat cap lamps, locomotive headlights, Joy Sulmet bits and electrical connectors, Barclay "Add-A-Ring" V-belt sheave permitting assembly of rings to easily make a sheave with any number of grooves on the job, Hayden belt splicers and cutters.

**Ohio Carbon Co.**, Cleveland—Carbon and metal brushes for motors and generators and all types of mining equipment.

**The Okonite Co., Hazard Div.**, Wilkes-Barre, Pa.—Twin mining-machine cable for continuous miners and shuttle cars, new Redshot blasting cable, wires, cables and tape for mining.

**Osmose Wood Preserving Co.**, Buffalo, N. Y.—Osmose timber preservatives.

**Pattin Mfg. Co.**, Marietta, Ohio—Roof bolts featuring new Style D expansion shields.

**Pennsylvania Rubber Co.**, Mansfield, Ohio—Pennsylvania tires for earthmoving equipment, trucks and automobiles.

**Persingers, Inc.**, Charleston, W. Va.—Continental conveyor idlers, Persingers lattice-type sectional belt conveyor, Quaker conveyor belting, Persingers variable-speed apron feeder, C-P rotary RBD-30 roof-bolt drill, C-P impact wrenches and coal drills.

**Persinger Supply Co.**, Williamson, W. Va.—Hartzell 48-in Vaneaxil fan, reciprocating feeder, Veelos belts, C-P coal drills and impact wrenches, Cedar Rapids return and roller assemblies, Carver self-priming mine pump, Jacuzzi water system, Aurora centrifugal pump, Krider crusher, Victaulic couplings, Barclay Add-A-Ring sheaves, ERE trolley tap, Timken rock bits, C-P Type RBD30 roof-bolt drill, Dodge pillow blocks, Dodge Torque-Arm speed reducer, sheaves and pulley, Heintz rubber-belt vulcanizer.

**Plomb Tool Co.**, Los Angeles—Proto hand mechanics tool for industrial and automotive uses.

**Post-Glover Electric Co.**, Cincinnati, Ohio—P G resistors and electric heaters.

**B. Preiser Co., Inc.**, Charleston, W. Va.—Coal-testing laboratory equipment and laboratory furniture.

**Pure Oil Co.**, Chicago—Pure Oil industrial oils and greases.

**Quaker Rubber Corp., Div. of H. K. Porter Co., Inc.**, Philadelphia—Quaker "Production-cered" belting.

**Raleigh Junk Co.**, Beckley, W. Va.—Used mining equipment.

**Reardon Co.**, Bayonne, N. J.—Bondex cement paint and Dramex one-coat interior finishes.

**Reid-Boice Tire & Tread Co.**, Bluefield, W. Va.—Conveyor belting repair, splicing and vulcanizing, General tires.

**Reliance Electric & Engineering Co.**, Cleveland—Precision Built AC motors, permissible DC motors, V-S adjustable speed drive for AC circuits.

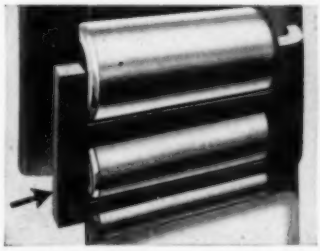
**Ridge Equipment Co.**, Frugality, Pa.—Portable preparation unit, including feeder, screen and crusher.

**Riggs Engineering Co., Inc.**, Ludlow, Ky.—Trabon automatic lubrication for underground coal mines and preparation plants.

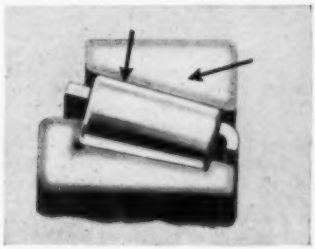
**Rish Equipment Co.**, Bluefield, W. Va.—Disston chain saws, Euclid 15-ton off-

# 9 good reasons for specifying TIMKEN® bearings in your mining equipment

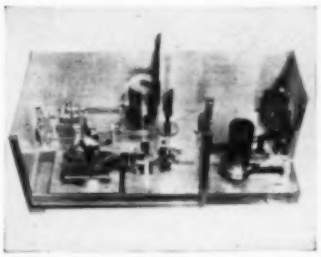
**26 TYPES.** Because Timken® bearings are made in 26 types, you get exactly the right tapered roller bearing for your job.



**SOFT STEEL CAGE** separates the rollers in Timken tapered roller bearings and prevents scuffing.



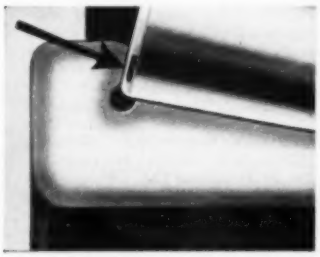
**TOUGH INSIDE—HARD OUTSIDE.** Case carburizing of rollers and races gives a wear-resistant surface, shock-resistant core.



**MICRO-INCH FINISH.** With help of the profilograph, which measures surface irregularities to a millionth of an inch, the Timken Company has developed a bearing finish of micro-inch accuracy.

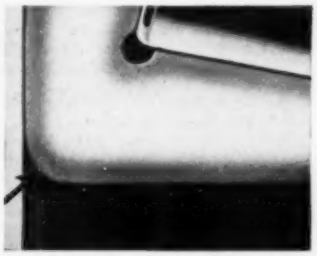
**5850 SIZES.** If you need a tapered roller bearing smaller around than your finger or as large as 71½" in diameter, you can get it from The Timken Roller Bearing Company.

**WE MAKE OUR OWN STEEL.** Because Timken bearings are made of special alloy steel, produced in the Timken Company's own mills, they have extra strength and wear resistance.



**RIB OF CONE** maintains roller alignment, prevents skewing, assures maximum bearing capacity.

**PRECISION MANUFACTURE** makes possible bearings with a maximum runout tolerance of less than 75 millionths of an inch.



**GENEROUS RADIUS** on the inside diameter of Timken bearing cones permits greater shaft strength.

No other tapered roller bearing gives you all the advantages you get with Timken bearings. Be sure every tapered roller bearing you use carries the name "Timken", the trade-mark of The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO".

**TIMKEN**

TRADE-MARK REG. U. S. PAT. OFF.

***TAPERED ROLLER BEARINGS***

**NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◎ AND THRUST ⊣◎⊢ LOADS OR ANY COMBINATION**

highway truck, International TD24 tractor with Bucyrus-Erie angle blade, International TD9 and TD6 tractors with Bucyrus-Erie blades, International diesel 60-kw DC generator, Hough Payloader, Ingersoll-Rand Gyroflo compressor, McCarthy Model 1030-36 coal-recovery auger drilling up to 36-in holes, Barber-Greene conveyors, P & H Mitimite truck crane, Gorman-Rupp mine and contractors' pumps, Silent-Glow portable oil heaters, Master generators, Tourna-Trowl, Wright pneumatic saw, new Drott Skid-Shovel for International tractors.

**Roberts & Schaefer,** Chicago—Coal-preparation equipment.

**Rockbestos Products Corp.,** New Haven, Conn.—Rockbestos AVC cable for wiring mining machinery and industrial wiring applications.

**John A. Roebling's Sons Co.,** Trenton, N. J.—Blue Center Steel wire ropes, Roeclad mining electrical cables, 4-in-diameter 6x61 Blue Center steel wire rope (the largest commercial rope made in the USA and used on suspension cables of strip shovels).

**Rome Cable Corp.,** Rome, N. Y.—Wires and cables, including Rome 60 mining cable.

**Rust-Oleum Corp.,** Evanston, Ill.—Rust-Oleum paints to stop and prevent rust, featuring application directly to rusted surfaces.

**Joseph T. Ryerson & Son, Inc.,** Chicago—Alloy, stainless and carbon steels, tubing, tool steel and babbit metal, Ryertex bearings.

**Sanford-Day Iron Works,** Knoxville, Tenn.—Automatic 3½-ton drop-bottom mine car with jerk-out latch, new loop-type tripper for jerk-out latch, ball- and Timken-bearing mine-car wheels.

**Schroeder Bros.,** Pittsburgh, Pa.—New Schroeder hydraulic hand-held coal drill powered from a cutting, timber or roof-bolting machine for fast safe drilling with electrical hazards removed from drilling area. Schroeder conveyor-control switch, mine-locomotive headlight, Type WI cable-splicing tape and Midland Throw-away bits for mining.

**Sherwin-Williams Co.,** Cleveland, Ohio—Industrial finishes and paints.

**Skilsaw, Inc.,** Chicago—Portable electric tools, including redesigned belt sander, high-speed grinder, saws and drills.

**Smith Welding Equipment Co.,** Minneapolis, Minn.—Welding equipment, including new Lite-O-Matic welding torches which can be instantly lighted or extinguished merely by pressing lever without touching the adjusting valves, and new Flo-Trol feature on torches permitting rapid change from welding to cutting without wrench or other tools.

**Socony-Vacuum Oil Co., Inc.,** New York—Coal-mine lubrication, featuring Gargoyle No. 480 grease, No. BRB1 grease and Viscolite oils.

**Southern Oxygen Co.,** Washington, D. C.—Southern oxygen and acetylene, Stoody hard-faced alloy rods, Victor welding equipment, Sight Feed acetylene generator, Jackson electrode holders, Alloy Rod Co. products, Stulz-Sickles manganese surfacing materials, Handy & Harman Easy-Flo flux, Miller AC welders, National Equipment Co. welding equipment, Scott Air Pack, Fyr-fiter fire extinguishers.

**Square-D Co.,** Detroit—Motor controls and low-voltage distribution equipment.

**W. R. Stamler Co.,** Paris, Ky.—Stamler hydraulic car spotter.

**Statewide Equipment Co.,** Charleston, W. Va.—LeTourneau E-18 18-ton Tournarocker, Super-C Tournadozer, Lorain MC-254 Motor-Crane with crane and ¾-yd-shovel fronts, Jaeger 125-cfm air compressor, Thor air tools, Thor 2-in sump pump and Macwhyte wire ropes.

**Steel Products Engineering Co.,** Springfield, Ohio—Combustioneer hopper- and bin-feed automatic coal stokers.

**Superior Sterling Co.,** Bluefield, W. Va.—Products of Anaconda Wire & Cable Co., Blackhawk Mfg. Co., Joseph E. Dixon Crucible Co., Black & Decker, Foote Bros. Gear & Machine Corp., B. F. Goodrich Co., Gorman-Rupp Co., Ideal Industries, Inc., Jeffrey Mfg. Co., Rockbestos Products Co., Rust-Oleum, Timken, Westinghouse and others.

**Syntron Co.,** Homer City, Pa.—Spiral vibrating feeder and elevator, vibrating horizontal feeder, screening feeder, Gravimetrics continuous weighing machine, electric tools.

**Tamping Bag Co.,** Mt. Vernon, Ill.—Seal-Tite wet-strength paper tamping bags, weed killer, Stay-Put lock nuts, Seal-Tite plastic pipe.

**Templeton, Kenly & Co.,** Chicago—Simplex jacks of all types and Re-Mo-Trol hydraulic units for testing roof-bolting installations.

**Texas Co.,** New York—Texaco lubricants for mining machinery.

**Timken Roller Bearing Co.,** Canton, Ohio—Timken carbide-insert and multi-use bits for mining, including SX rock bits specially designed for roof-bolting; Timken tapered roller bearings.

**Toledo Pipe & Threading Machine Co.,** Toledo, Ohio—Power pipe threading machines, hand tools for pipe threading.

**Bertrand P. Tracy Co.,** Pittsburgh—Locomotive gears and pinions, cutter bars, Hummingbird cutter chains.

**Trumbull Electric Co., Dept. of General Electric,** Plainville, Conn.—Switches, magnetic starters, trolley closure and other electrical components, including newly developed mine-type Flex-A-Power electrical distribution switchboard specially applicable to tipple operation.

**Union Wire Rope Corp.,** Kansas City, Mo.—Wire rope, Tuffy slings.

**United States Rubber Co.,** New York—Electrical wires and cables, underground belts, conveyor belts, friction tape, belt splicing.

**United States Steel Co. and Divisions,** Pittsburgh—Cor-Ten and Tri-Ten high-strength steels, AR abrasive-resistant steel, stainless-steel screens and wear plates, Amerclad cord and cable, American Tiger wire rope, Tigerweld power bonds, Cyclone fencing, and creosote oil preservative.

**Van Cleef Bros., Inc.,** Chicago—Dutch Brand insulating tape, masking tape, rubber products.

**Victaulic Corp. of America,** New York—Victaulic line of pipe couplings and fittings, and hand- and power-operated Vic-Groovers.

**Virginian Electric Co.,** Charleston, W. Va.—Republic industrial products, Schroeder mine-locomotive headlight.

**Vita-Var Corp.,** Newark, N. J.—Paints, enamels and varnishes.

**West Virginia Armature Co.,** Bluefield, W. Va.—Armature and field coils, bronze bushings and bearings, mining replacement parts and repair service, SKF ball bearings, Dolph insulating varnishes, Pittsburgh gears and pinions, new Baldwin reamer for securing Baldwin tapered-head roof bolts designed to provide more bearing surface and greater holding power.

**West Virginia Steel Corp.,** Charleston, W. Va.—Steel fabrication and erection, Tiger-brand wire ropes, Lincoln electrodes.

**West Virginia Steel & Mfg. Co.,** Huntington, W. Va.—Roof bolts and track material, including new expansion unit of improved design for ⅝- and ¾-in roof bolts; new hydraulic rail bender, and new specially designed angle washer for simplifying installation of angle roof bolts.

**West Virginia Tractor & Equipment Corp.,** Charleston, W. Va.—Caterpillar D318 100-hp and D315 335-hp diesel engines, D6 tractor with dozer, No. 212 motor grader.

**Westinghouse Electric Corp.,** Pittsburgh—Westinghouse safety switches, starters and controls, lamps, brushes, line material, roof-bolt expansion shells and other products, including new portable switchboard contained in a suitcase designed for easy connection to electrical units and with dials showing wattage, amperage, voltage and power factor; new line of LifeLine motor starters; patented Diamond-Point safety switch designed to limit arcing to one point; and new fluorescent-mercury lamp providing high-intensity white light.

**Andy Williams, Inc.,** Bluefield, W. Va.—Ford trucks and cars, including the new Cargo King V-8 145-hp engine.

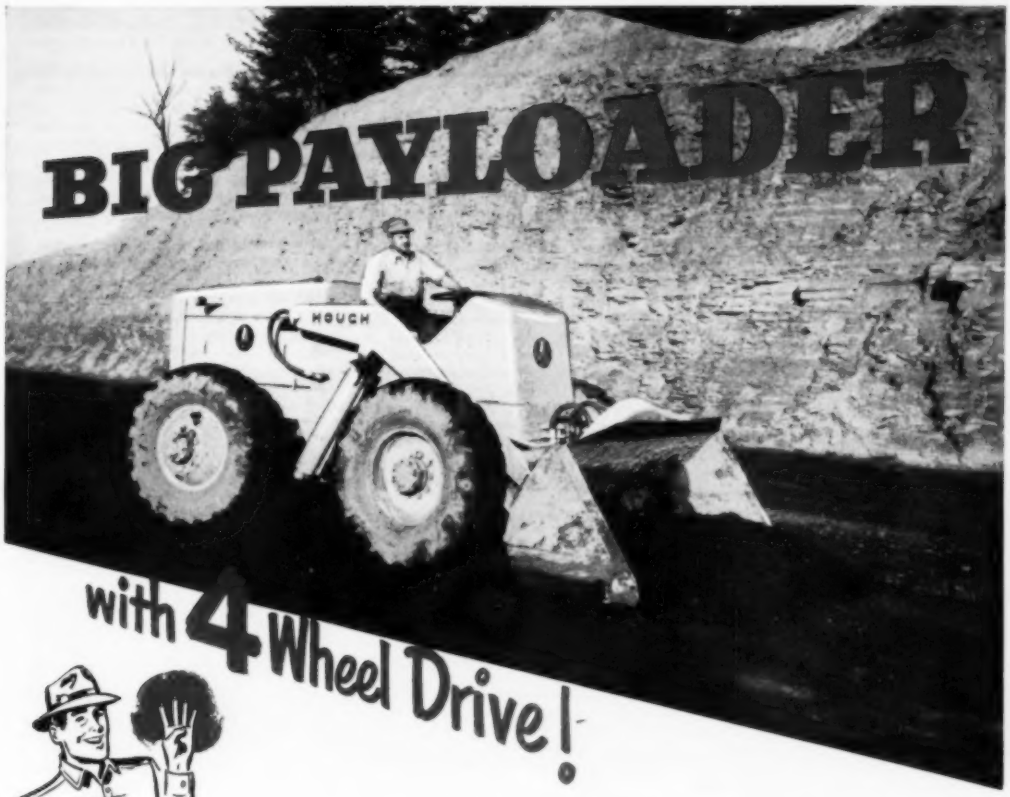
**Williamson Supply Co.,** Williamson, W. Va.—Vascaloy-Ramet tungsten-carbide mining tools, Simplex wire and cable, Bethlehem roof bolts and accessories.

**Daniel Woodhead Co.,** Chicago—New Safeway Lovolt portable work lamp reducing up to 120 v to 6 v for safe handling and operation and featuring a neoprene-base rubber covering, Turnex electrical cord connectors, and watertight light sockets.

**Yardley Plastics Co.,** Columbus, Ohio—Yardley flexible and rigid plastic pipe for mining, and new-type Tenite-2 rigid piping specifically for oil, gas or salt lines.

Other exhibitors included:
**Appalachian Electric Power Co.**
**Coal Age.**
**Norfolk & Western Ry.**
**U. S. Bureau of Mines.**
**West Virginia Dept. of Mines.**
**West Virginia Heart Association.**
**West Virginia State College.**
**West Virginia University.**

# BIG PAYLOADER




## with 4 Wheel Drive!

The big 1½ cu. yd. Model HM "PAYLOADER" has become a fixture at many mines because of its ability to do so many jobs well and to get around fast on clay, sand, mud or snow. Big earth mover tires and four wheel drive give it crawler-like traction at far less maintenance expense. Four speeds in each direction and power-boosted steering give it maneuverability plus speed *to* the job and *on* the job.

This powerful tractor-shovel does many jobs — cleans tops of veins, feeds stripping shovels, loads trucks, maintains roads, moves tools and supplies . . . lifts, pushes, carries. Double-acting hydraulic rams raise and lower the booms and dump and close the bucket . . . exert tons of down pressure for tough digging conditions.

See the Model HM in action and you'll see why it's a hit at pits, tipples, yards and plants. Write for full facts and the name of your "PAYLOADER" Distributor. The Frank G. Hough Co., 735 Sunnyside Avenue, Libertyville, Illinois.

**write** for catalogs and full details on any size "PAYLOADER" — the four wheel drive 1½ cu. yd. Model HM and 1 cu. yd. Model HR or any of the six 2-wheel-drive models from 12 cu. ft. to 1¼ cu. yd. bucket capacity.

PAYLOADER®

# Among the Manufacturers

**N. R. Knox,** associated with the Bucyrus-Erie Co., S. Milwaukee, Wis., or its predecessors for 32 yr and president since 1943, has been elected vice chairman of the board of directors. W. L. Little has been elected president and chief executive officer in all operating matters. With the company or its predecessors for 26 yr, Mr. Little has been executive vice president since 1950.

**Irving S. Olds,** having reached the corporation's retirement age, last month retired as chairman of the board of directors of United States Steel Corp. and was succeeded as chairman by Benjamin F. Fairless. Mr. Fairless, who was named chief executive officer of the corporation, will continue to serve as president, a position he has occupied since Jan. 1, 1938, and will also continue as president of United States Steel Co. A son of a coal miner, Mr. Fairless has spent almost his entire career in the steel industry.

**Howard A. Bellows,** recently named a vice president of General Tire & Rubber Co., Akron, Ohio, has been placed in charge of all General's replacement tire and tube sales, and John E. Powers, formerly trade sales manager, has been promoted to general sales manager of plastics and special products.

**Fred J. Ebeling** has been named to the newly created post of general sales manager, Dodge Mfg. Corp., Mishawaka, Ind. Mr. Ebeling joined the company as credit manager in 1943 and soon after was elected assistant treasurer, later becoming assistant secretary-treasurer.

**Westinghouse Electric Corp.** has announced the election of three vice presidents to head 12 of the company's 31 divisions. W. W. Sproul becomes vice president in charge of the company's general industrial products group of divisions, which comprise the Micarta, Standard Control, Small Motor, Elevator, Sturtevant, Welding, and Lighting divisions, and the Bryant Electric Co. Mr. Sproul, 25 yr with Westinghouse, had been sales manager, industrial products. L. B. McCully, now vice president in charge of the East Pittsburgh divisions, had been manager of the same divisions, which are Switchgear. He joined Westinghouse 36 yr ago. H. E. Seim is vice president in charge of the Sturtevant division, with headquarters at Boston, Mass., and also the Bryant Electric Co., a wholly-owned subsidiary at Bridgeport, Conn. Mr. Seim, who had been general manager of both operations, joined Bryant Electric in 1909 as an office boy.

**John L. Michaelis,** formerly chief engineer of the New Martinsville plant of the Columbia Southern Chemical Corp., has joined Heyl & Patterson, Inc., Pittsburgh, Pa., as contracting engineer in connection with the sales and service of the American line of Reineveld centrifuges and separators. For the past 15 yr Mr. Michaelis has been engaged in mechanical and electrical phases of chemical-plant maintenance and construction work and recently returned from a 2-mo trip to Western Europe where he studied actual installations and applications of the Reineveld centrifugal machines.

**Forrest O. Calhoon,** president of the Disco Co., Div. of the Pittsburgh Consolidation Coal Co., has rejoined Koppers Co., Inc. Mr. Calhoon, who was associated with Koppers from 1927 to 1946, will serve as a technical adviser, reporting to Fred C. Foy, vice president and general manager of the Tar Products Div.

**Stanley M. Hunter** has announced his resignation as vice president and director of American Hoist & Derrick Co., St. Paul, Minn. Mr. Hunter joined the sales department of the company in 1936, progressing to general manager of sales and vice president of sales, and becoming executive vice president in 1949. His future plans were not immediately released.

**Jack Feucht** has been appointed chief engineer, Cleveland Rock Drill Div., Le Roi Co., Cleveland, Ohio. Mr. Feucht joined the company 11 yr ago and after doing test and assembly work, became a development engineer. Theodore Schmidt, associated with Mr. Feucht for many years in the development of many Le Roi-Cleveland products, has been appointed assistant chief engineer.

**Pennsylvania Crusher Co.,** Div. of Bath Iron Works Corp., Philadelphia, has named Edwin H. Keiper chief engineer. Mr. Keiper joined Pennsylvania Crusher as a draftsman in 1919 and has been chief service engineer since 1949.

**Cyril S. Kranick** has been appointed a sales engineer for the Western Machinery Co. in the New England and Middle Atlantic states, with headquarters in Dunmore, Pa.

**The name of the Firth Sterling Steel & Carbide Corp.,** Pittsburgh, was changed to Firth Sterling, Inc., at the annual stock holders meeting April 29. The action was taken, according to K. D. Mann, president, because the nature of the company's business had broadened to such an extent that the former name was no longer descriptive of the range of products now being produced, including high-temperature alloys, heavy metal for shielding gamma rays of atomic energy and other items of a classified nature.

**Gar Wood Industries, Inc.,** Wayne, Mich., has announced several changes in its top personnel. H. H. Hippler has been named assistant director, sales and advertising, and R. F. Whitworth, formerly sales manager, national accounts, has been named to succeed Mr. Hippler as manager of Gar Wood's branch division. Ross Miller, former manager of Gar Wood's factory branch in Chicago, has been named vice president and general manager, National Lift Co., Waukesha, Wis., a Gar Wood subsidiary. R. S. Hay has been appointed sales manager of the Findlay division of Gar Wood, Findlay, Ohio. At the same time, the appointments were announced of R. M. Steegman to Mr. Jay's former position of assistant sales manager in charge of Buckeye equipment and David J. Davis as assistant sales manager in charge of tractor equipment. Mr. Steegman and Mr. Davis were formerly district managers in the midwest and southwest, respectively.

**Harry Beach,** who formerly covered the North Central States, has been assigned to the Pennsylvania-New Jersey area to represent the Flexible Steel Lac-

**Chain Belt in New Administrative Offices**

**CHAIN BELT CO.** now is occupying this modern new administration building at 4701 Greenfield Ave., Milwaukee, Wis. For the past 50 yr it had its executive headquarters at 1600 W. Bruce St. Of brick, stainless-steel and glass construction and featuring the latest in office design and equipment, the new building is directly adjacent to the company's Milwaukee manufacturing facilities.

**Buy Safe!** Don't gamble

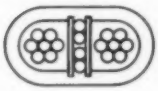
on just any shuttle car cable—

you may lose

One break is trouble enough. Frequent breaks prove your cable faulty. Down time and repair losses soon mount higher than original cable costs. It's just common sense to buy the best in the beginning.

for longer "break-free" service insist on

This is AnacondA Securityflex Shuttle Car Cable. Note patented breaker strip and D-shaped insulation to prevent overriding. No other cable offers these plus features.



**Cold Rubber Insulated Securityflex**

Almost any cable looks good when new. It's *service* that counts. ANACONDA Securityflex* portable power cable serves well through many, many hours of tough, rough use. There's a good reason why.

Cold rubber insulation—an ANACONDA First—is 50% more resistant to moisture than regular rubber. Special-strength neoprene jacket takes abrasion, heat, rockfall, and run-overs in stride where other types fail.

Securityflex functions nicely. Under reel tension, over guides, and in frequent sharp bends, it doesn't fatigue readily. It won't override, kink, or twist.

This ANACONDA Cable is safe—a look at the patented "anti-short" breaker strip and D-shaped insulation tells why. This is *plus* protection.

Write your nearest Anaconda Sales Office or Distributor for more information. Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

*Trademark

**the right cable for the job ANACONDA® wire and cable**

Are you getting these

# Bonus Benefits

of Red-Strand wire rope

QUALITY?

Does your present wire rope *deliver top tonnage?*

Have you considered the extra *labor-savings* resulting from less frequent replacement with Hercules' Red-Strand?

Do you know that these two benefits are top ones with Hercules Red-Strand wire rope users?

Are you getting wire rope that is manufactured with the precise care . . . the exacting insistence upon *higher-than-rated* quality . . . and the specialized craftsmanship that goes into Hercules Red-Strand wire rope?

*If you're not sure . . . FIND OUT*

It means money to you. Leschen wire rope specialists will help you answer these questions . . . to your profit. There's no obligation. Ask them.

Write for your free copy of "Use and Care of Leschen Wire Rope."

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DISTRIBUTORS IN ALL PRINCIPAL CITIES

In business only to make wire rope — better wire rope — since 1857.

Preformed • Round Strand • Flattened Strand • Non-Rotating • Locked Coil • Slings


ing Co., succeeding Creighton L. Garesche, who has retired because of ill health. Hugh L. Coates, Jr., has been named to replace Mr. Beach as representative in the North Central States.

**C. Denton Slaughter,** 67, assistant general sales manager, Anaconda Wire & Cable Corp., died April 15 at his home in New York after a short illness. With Anaconda for more than 33 yr, Mr. Slaughter had been in the main office in New York for the past 20 yr and recently had devoted a great deal of his time to training young engineers in sales work.

**Johnson Plastic Corp.,** Chagrin Falls, Ohio, recently completed a 22,000-sq ft expansion at its main plant designed to help meet heavy demands for its products. Completely fireproof and of concrete block and steel construction, the addition will house a new molding department to increase production and streamline over-all operations.

**Hewitt-Robins, Inc.,** has opened an additional office in the Porter Bldg., 406 W. 34 St., Kansas City, Mo. In charge of the office will be Robert E. Crane, field engineer, who has been with Hewitt-Robins for 15 yr, the last five in charge of the company office in Tulsa, Okla. Mr. Crane will represent three of the four corporate divisions: Hewitt Rubber, Robins Conveyors and Robins Engineers.

**Rome Cable Corp.,** Rome, N. Y., has opened a new sales office at 1207 Grand Ave., Kansas City 6, Mo., to service the growing demand for Rome products in the Kansas-Missouri area. R. R. Davis has been named branch sales manager.

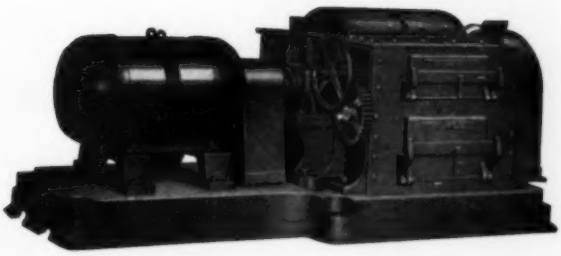
**A new educational program,** the Westinghouse-Johns Hopkins Awards in Electrical Engineering for 1952, has been established to help deserving young people pursue careers in the field of electrical engineering. The awards will enable 30 students a year to combine work experience at Westinghouse with technical studies leading to a Certificate in Electrical Engineering to be granted by McCoy College of Johns Hopkins University. Candidates selected on the basis of tests, school records and recommendations and interviews will be employed in one of the Westinghouse plants in the Baltimore area for 32 hr a week at regular scale wages and will be given work-experience in keeping with their ability and studies. On the completion of each course, Westinghouse will reimburse the student for one-half the tuition, registration and laboratory fees. At the successful completion of the 3 yr program, Westinghouse will reimburse the student for the other half of the fees. On a monetary basis, the winner can expect to get about $1,200 worth of courses. Once the program is in full swing, it was estimated, the cost to Westinghouse will be about $30,000 per year. The program is being set up for students in the Baltimore area, but its success may lead to its adoption by other Westinghouse divisions.

**The dramatic story** of the invention of the scale by Thaddeus Fairbanks was told to a nationwide radio audience on du

# FOR LESS THAN

# AMERICANS WILL CRUSH

# 1 TON OF COAL



**Based on Case Histories Involving 61,000,000 Tons of Coal**

Costs include . . . Depreciation, Maintenance, Replacement parts, Interest on Investment, and Power

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**American PULVERIZER COMPANY**

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# Track to Trackless Economy for LESS...

"Trackless Mining" with conventional cutters, loaders and shuttle cars is recognized by operators throughout the United States as the most economical and efficient mining system that has yet been completely developed for present day coal mining operations.

CONVERTED GOODMAN 460 OR 360 LOADER

## CONVERTED LOADING MACHINES

"Lee-Norse Conversions" thoroughly tested and proved during the past decade offer you the opportunity to go "Trackless" now by converting your present track cutters and loaders at much less cost than investing in new mining machines.

CONVERTED GOODMAN 224 CUTTER

CONVERTED JEFFREY 29U CUTTER

## CONVERTED CUTTING MACHINES

Before you buy new machines, investigate the advantages "Lee-Norse Conversions" offer you, namely:

1. Lower investment compared with new mining machines.
2. Very little increase in spare parts inventory.
3. Converted machines well known to your operators and maintenance men. No need for re-education.
4. No time lost during change-over. Conversions take less than 30 days.
5. Obsolescence losses due to possible new continuous miner development held to a minimum.

*It's Smart to Convert*

**Lee-Norse Company**

CHARLEROI, PA.


Pont's Cavalcade of America program April 22. "The Yankee and the Scales" told how Fairbanks, in 1830, devised the forerunner of the modern Fairbanks-Morse scale, an invention that was the first major improvement in weighing since the ancient Roman steel-yard. In 1850, a 17-yr-old boy, Charles Hosmer Morse, apprenticed himself to Thaddeus Fairbanks for a wage of $50 a year. Following the traditional American success story, the boy went on to found Fairbanks, Morse & Co., in 1865, present-day successor to the original Fairbanks firm. His grandson, Robert H. Morse, Jr., is president of the company today.

**Open-house ceremonies** will be held June 5 at the new standard carbide-tool fabricating plant of the Carboloy Dept., General Electric Co., Edmore, Mich. The newly completed 45,000-sq ft plant now operating on a production-line basis is located on a 33-acre plot. Approximately 3,000 residents of the community area are expected to attend the ceremonies, which will include talks by Chester H. Lang, G-E vice president in charge of public relations; K. R. Beardslee, Carboloy Dept. general manager; Robert Paxton, G-E executive vice president; and Justin R. Whiting, chairman of the board, Consumers Power Co. The new Alnico permanent-magnet manufacturing plant to be completed in 1953 will be located adjacent to the Edmore plant.

**Quaker Rubber Corp.**, Div. of H. K. Porter Co., Inc., Philadelphia, has put into operation a new $275,000 wire braided hose department created to meet the demands for heavy-duty high-pressure hose caused by the increased trend toward the use of hydraulic systems for control purposes. Five specially designed braiders now are producing high-pressure hydraulic control hose in a full range of sizes for both military and civilian use.

**Its 60th birthday** was celebrated by the industrial supply firm of Somers, Fitler & Todd Co. at a party held in the Sheraton Hotel in Pittsburgh, Pa., May 1. Company executives joined employees in marking six decades of service to business and industry located in the tri-state area of western Pennsylvania, eastern Ohio and northern West Virginia. The group heard informal talks given by William T. Todd, Jr., president; Kenneth R. Todd, vice president in charge of abrasives; F. Crossman, vice president in charge of engineering; and Edward L. Alberter, vice president in charge of sales. H. L. Murray and Steve Church, two of the oldest of the company's 150 employees, told of past events in the company's history.

**Westinghouse Electric Corp.** recently broke ground for a $6 million steam- and gas-turbine development laboratory at the company's S. Philadelphia works. Actual construction of the four-story brick and structural-steel building will begin late this summer and will take about a year to complete. It will employ a staff of nearly 100 engineers and technicians and initially will conduct special research

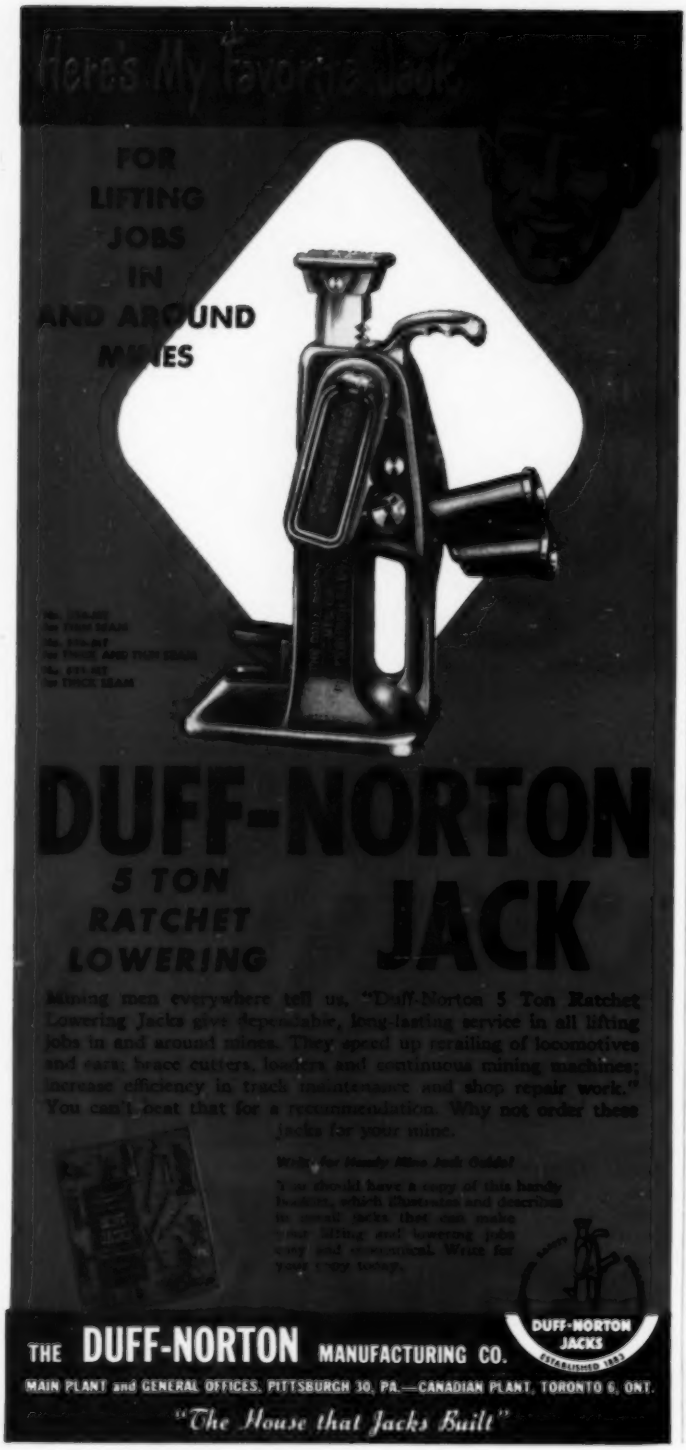
*Tough, flexible Hazacord® Twin Type G. Note the mold-cured Hazaprene ZBF Sheath that forms a flame-resistant barrier between the power and grounding conductors and prevents short-circuiting.*

In the rough and tough mining industry, it takes real men to operate the heavy-duty equipment . . . and rugged cable to keep it on the job.

Engineered throughout for this tough service, Hazacord® Twin mining cable has the stamina to stand up under the many punishing conditions of underground work. The tough Hazaprene ZBF Sheath — vulcanized under pressure in a metal mold — has the smooth finish, density, resistance to flame, moisture and abrasion required for safety and long life. The separately insulated conductors are each reinforced with a moisture-resistant, non-rotting open braid which locks conductors and sheath into one integral mass and prevents internal slipping. Yet, with all this protection, Hazacord mining machine cable has the flexibility that adds years of extra life.

Hazacord mining machine cable is certified as flame resistant by the U. S. Bureau of Mines and the Pennsylvania Department of Mines—look for "P-104BM" molded into the sheath. For full information on the complete line of Hazacord portable cables and flexible cords used by the mining industry, write Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pennsylvania.

**HAZACORD** *Mold-Cured* **portable cables**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FOR LIFTING JOBS IN AND AROUND MINES
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5 TON RATCHET LOWERING
JACK
Mining men everywhere tell us, "Duff-Norton 5 Ton Ratchet Lowering Jacks give dependable, long-lasting service in all lifting jobs in and around mines. They speed up rerailing of locomotives and cars; brace cutters, loaders and continuous mining machines; increase efficiency in track maintenance and shop repair work." You can't beat that for a recommendation. Why not order these jacks for your mine.
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for the U. S. Air Force. "This new research center will be the most modern engineering development laboratory of its kind in the nation and it is being built to maintain the flow of knowledge necessary for future improvements and new discoveries and developments in power generating equipment," according to D. W. R. Morgan, Westinghouse vice president. United Engineers & Constructors, Inc., Philadelphia, will construct the new building according to Westinghouse specifications.

## Anthracite Conference Seeks Bigger Markets

**Begins on p. 110**

**Speakers and their topics** at the Friday morning session were: Charles J. Farrell, Design Service, Valencia, Pa., on **Heat-Bank System of Heating;** Dr. Johnson on **Anthracite Equipment for New Housing;** J. F. Barkley, chief, Division of Solid Fuels, USBM, Washington, D.C., on **Domestic Hand-Firing of Pea Anthracite;** Dr. C. C. Wright, chief, Division of Fuels Technology, Pennsylvania State College, on **Activated Carbon From Anthracite;** and Howard Grendon, graduate assistant, Division of Fuel Technology, Pennsylvania State College, on **A Fundamental Study of the Combustion of Anthracite.**

The new "heat-bank" system for heating living quarters, as incorporated in several new housing developments, features radiators against interior rather than outside walls, Mr. Farrell explained in pointing out certain advantages, such as less heat loss through the outside wall, lower operating temperatures by storing heat in both sides of the interior wall, and less condensation. As shown in slides, the new system features baseboard heating units that radiate heat at ankle level, the most efficient placement for the comfort of the occupants, Mr. Farrell said. The design also increases installation economy because distances to be piped from a centrally located furnace are substantially shorter.

In describing the research activities of The Anthracite Institute, Dr. Johnson explained investigations into the design of outside furnaces for basementless homes; the new Anthra-Hearth fireplace grate developed by Donald Markle, president, Jeddo-Highland Coal Co.; and automatic ash removal. In explaining some of the Institute's advance thinking, Dr. Johnson predicted that anthracite some day may heat homes by burning at a slow rate in specially constructed bins, the heat to be stored in an installed pit and drawn off as needed through thermostatically controlled valves.

With reasonable care in hand-firing, an average of 89.2% of the heat in pea anthracite went into the water of a cast-iron heating boiler, Mr. Barkley reported. The good results were achieved by careful firing and grate shaking, and by plugging up possible air leaks such as the opening for the grate lever. Because of the lower price of pea coal, many consumers could benefit financially and suf-

## *Use*
## *RECORD MAKER Conveyor Belting*

● Speed up operations above and below ground with Republic Rubber's tough Record Maker Conveyor Belting . . . **a belt specially made for handling coal** . . . a resilient rubber-covered belt that resists abrasion, wards off cutting blows and keeps steadily on the move despite constant flexing, buffeting, impact and other service stresses incidental to mining operations.

Record Maker Conveyor Belting is made with rounded edges, reinforced by an extra thick cushion of wear-resistant rubber. This feature, plus the special anti-mildew treated fabrics used in the ply construction, gives Record Maker Belting an increased work capacity that means bigger profits with less effort.

Record Maker Conveyor Belting, like all Republic Rubber Products designed for coal field service, is sold locally through expert Republic Distributors who, by making a **free** analysis of your **exact** needs, can help you toward better performance records and lowered costs. Contact your Republic Rubber Distributor today or write direct for further information.

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**REPUBLIC RUBBER DIVISION**

Lee Rubber & Tire Corporation

YOUNGSTOWN, OHIO

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YOUR SCRAP
to keep steel production up
Rising steel production depends on an increasing flow of scrap. Your scrap is needed.
About 1,000 pounds of iron and steel scrap are required to produce one ton of steel. Now, with steel production greatly expanded to meet civilian and military requirements, more scrap is essential. Every pound is needed if steel mills are to keep running at capacity.
You can help by checking both above and below ground for all kinds of iron and steel scrap. Collect worn-out or obsolete parts and equipment—tools, conveyors, cars, processing equipment, rails, trucks—then call your local scrap dealer.
But don't stop there. Organize a system of regular collections to keep scrap moving.
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fer no loss of heating efficiency by learning how to use pea sizes correctly, Mr. Barkley advised.

In describing the activation of anthracite samples, Dr. Wright reported that lower density high-volatile anthracites seem to activate more easily than other types. With regard to market possibilities, Dr. Wright declared that activated carbon prepared by selective oxidation of unbriquetted anthracite with steam has activity properties that may make its use as a cheap absorbent carbon feasible because of the comparatively simple operation and relatively high carbon yield. The use of activated carbon is widespread in water filtering, food processing and chemical production. Co-authors of the paper with Dr. Wright were J. D. Clendenin, USBM, Schuylkill Haven, Pa.; and W. T. Griffiths, Milton Roy Co., Philadelphia, Pa.

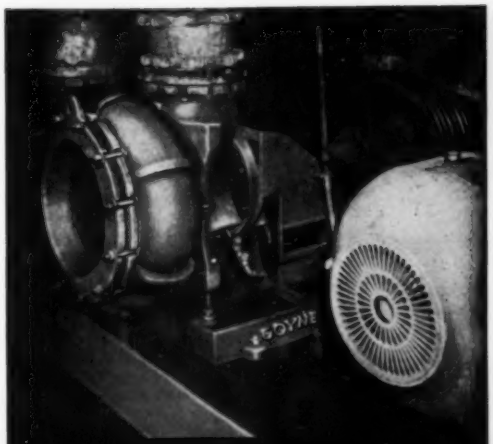
In presenting observations of basic studies of anthracite combustion, Mr. Grendon, who made the studies in collaboration with Dr. Wright, reported that the work is to continue toward the goal of contributing valuable knowledge to the science of gasification, another possible outlet for anthracite. Using laboratory specimens prepared by mixing fine anthracite with binders, such as fine china clay, Mr. Grendon is studying the effect of ash on burning characteristics.

**On Friday afternoon** Robert Loomis, chief engineer, MotorStoker Division, Hershey Machine & Foundry Co., Manheim, Pa., described a **New Commercial Cross-Feed Stoker,** and J. J. Hassett, president, Elmira Coal Co., Elmira, N.Y., related experience with the **Losch Conversion Stoker.** R. H. Hampton, manager, New York office, Beaumont Birch Co., Philadelphia, described **Ash and Coal Handling in Commercial and Small Industrial Stokers;** and Neil H. Gebhardt, president, G. J. Gebhardt Coal & Coke Co., Erie, Pa., told of the development and application of an **Automatic Ash-Disposal System.**

A newly developed cross-feed stoker for commercial plants is designed so that multiple burning units may be coupled together to provide the desired capacity up to burning rates of 300 lb per hour, Mr. Loomis reported. The new MotorStoker unit, designed for simplicity, employs a plunger feed mechanism to push the coal across a stationary grate. One of the features of the new unit is its rapid acceleration to peak output from a banked condition. Tests have indicated full output in 40 min after an 8-hr layoff. Units of this size place anthracite in competition in a commercial field previously restricted almost wholly to oil, Mr. Loomis said.

Describing the Losch conversion grate as an almost level cross-feed water-cooled burner, Mr. Hassett stated that it is lower in installation cost to the user, returns higher net to the dealer and requires minimum maintenance and service. The Losch grate burns sizes from pea to No. 3 buckwheat. A differential shaking motion is imparted to the unit by a cam drive, thus providing a simple means for feeding coal and dropping ash, Mr. Hassett explained.

Pointing out that one of the biggest



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## SOLIDS HANDLING PUMP

**Feature:**
**LOW-COST OPERATION**

GOYNE SOLIDS HANDLING PUMPS are extremely popular with a very large number of coal companies who find them quite reliable for pumping:

Liquids with solids added to increase specific gravities for coal and refuse separation in coal preparation plants.

Disposing of refuse and silt by pumping to waste material banks or for back filling into mined out areas.

Pumping prepared coal to temporarily desired storage areas.

These specially designed Goyne pumps incorporate numerous features to reduce upkeep and labor maintenance costs to a minimum:

1. Ease of inspection of all wearing parts. All internal portions are immediately accessible after removing *only the rear head of the pump.* No suction or discharge piping or any other major part of the pump is disturbed.

2. The only packing box of the pump is subjected to the low suction pressure rather than to the discharge pressure developed by the pump. This feature assures long packing and shaft sleeve life.

3. Impeller clearance is adjusted while the pump is running, insuring constant pump capacity so essential for uniform washing.

4. There are twenty-eight possible nozzle assembly combinations for each standard pump. Washery designers like this "adaptability feature" as it helps them out of tight places and simplifies piping.

5. Spare parts are carried in stock at our plant for prompt shipment. Reduce your inventory by using Goyne Process Pumps.

*All inquiries are given a thorough engineering analysis and our prompt attention.*

GOYNE MINE PUMPS 1881

**The GOYNE STEAM PUMP CO.**
ASHLAND, PA.

# Competitive Coal market?

LOWER your production costs! Installation of carefully selected preparation plant equipment, competently engineered, will decrease labor costs and increase your realization by upgrading your product.

An informal discussion of your coal preparation problems and a tentative survey of your present facilities may be arranged without obligation.

**There will always be a Market for Quality Products**

TMC

Templeton-Matthews moderate fees average less than 5% of the total job cost. For further information write today!

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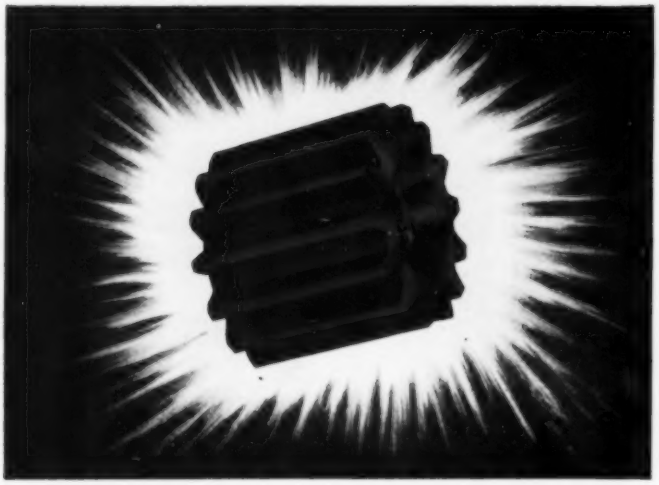

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**ARMORED Gear**

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Increasing gear life may be a real problem for you but it's our business. It is something we do by combining design, metal, and machining with a special heat-treating process and experience we have gained making quality gears since 1914.

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problems facing coal users is labor cost, Mr. Hampton said that plants burning less than 3,000 tons per year might consider monorail bucket systems for handling coal and ash, while larger plants can justify investment in permanent conveyor systems. Showing slides of typical installations, Mr. Hampton explained that each plant should have individual study to achieve most efficient coal- and ash-handling by taking advantage of all natural factors present, such as ample water and spoil area for an ash-pumping system.

Completely automatic coal heat is a reality since the development of the Koal-Vac, a vacuum ash-removal system, Mr. Gebhardt declared. Several installations in Erie, served by a Gebhardt truck, are showing that with coal heat the home owner and the dealer's drivers seldom enter the basement. The Koal-Vac consists of a screw conveyor from the ash pit to the ash bin and 2-in vacuum pipes from the ash bin to the exterior of the house. A special truck with vacuum fan connects to the outlets through flexible hose and removes ashes in a matter of minutes. If demand for the units can be increased, the present $325 installation price can be drastically reduced, Mr. Gebhardt declared, the present price being a reflection of the fact that the Koal-Vac now is hand-made. Mr. Gebhardt noted genuine interest among architects and builders after they have inspected working units.

## AMC Scans Progress, Probes Industry Future

**Begins on p 105**

tric switchmen is the best answer we have found, so far, to a more-efficient and a safer haulage system."

**"Selection was made because of the consistently good job of gathering haulage being done."**

Gathering and service haulage with track and mine cars in an area of heavy grades at a mine of the Stonega Coke & Coal Co. was the topic of B. M. Neel, assistant general superintendent, Big Stone Gap, Va. Maximum pitch on which mining is done is 20%. Haulage equipment includes 6-ton locomotives and 3.15-ton mine cars. This same equipment is used for delivering supplies.

"It has been possible to mine some of this territory," Mr. Neel remarked, "only because of engineering ingenuity, development of unusual skill by gathering-locomotive crews, and the meticulous use of shop-made skids and car-holding devices. These have resulted in an efficient operation.

**"We should map the area [after determining coal reserves] and determine . . . whether to install complete belt-conveyor haulage or use a combination of track and belts."**

# WHY ARE PRECISION CHAINS & BITS NOTED "*for Better Cutting Action*" ?

## BECAUSE THEY GIVE:

1. Unexcelled smoothness of sumping and cutting.
2. Less spreading stress on cutterbar.
3. Freedom from destructive coring.
4. A full clean kerf.
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For the sound mechanical reasons, call your nearest Precision distributor—or write for catalog.

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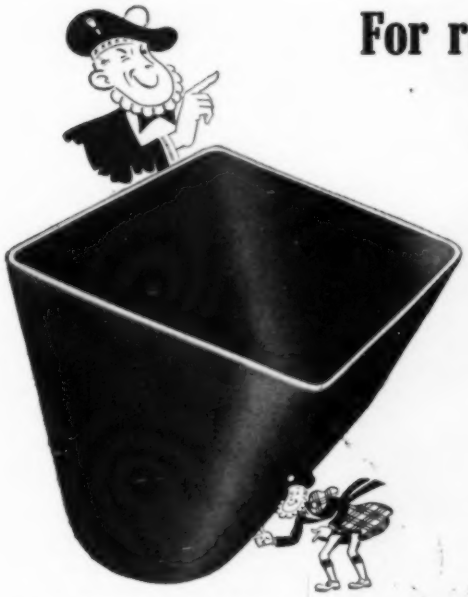
Distributors: Pittsburgh, Huntington, Denver, Christopher, Ill., Helper, Utah, Terre Haute



# For rugged, 3-shift service . . . specify LINK-BELT Cast Buckets

YOU get extra dividends in longer life with Link-Belt Cast Buckets —

- Abrasion, corrosion and tough usage meet their match in top-grade Link-Belt malleable iron or Promal (the stronger, longer-wearing metal).
- Friction and wear are minimized by smooth, seamless surface.
- Corners are reinforced for added strength.

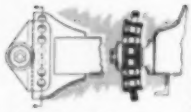
Equally important, accurate balance and advanced design give you the proper filling . . . clean discharge.

Link-Belt builds all sizes in six different styles . . . for either chain or belt mounting. Complete L-B line also includes steel buckets of various designs. The next time you replace your elevator buckets, call your Link-Belt representative for all the facts.

LINK-BELT
CAST ELEVATOR BUCKETS

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices, Factory Branch Stores and Distributors in principal cities. 12,014

**Another reason why BAKER is the BETTER blade**



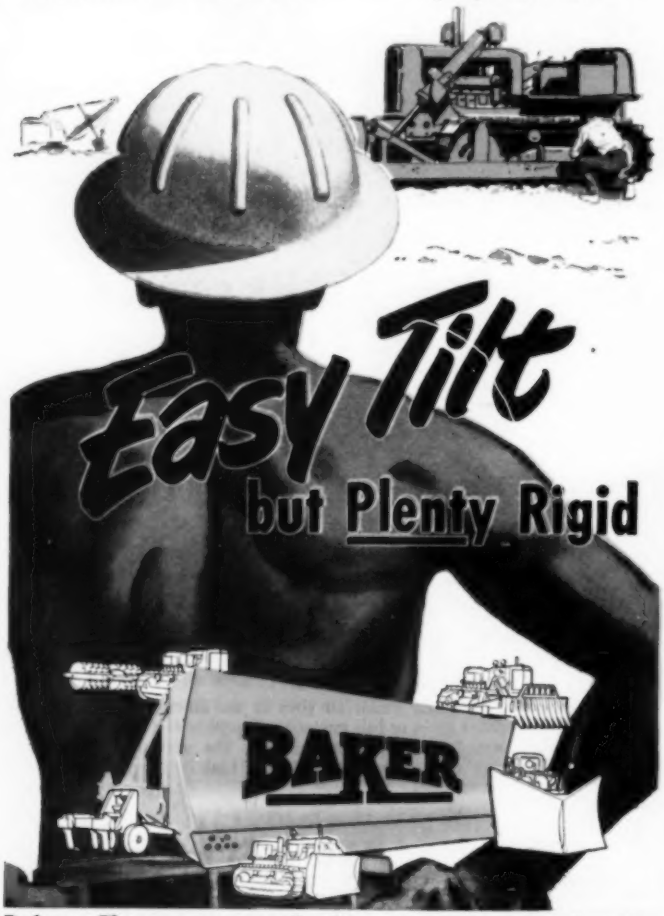
Baker Blades are designed not only for peak flexibility, but for *rigidity.* With up to 12 inches of tilt available in five positions, the operator simply adjusts the frame at the trunnion brackets by shifting two pins. Also, adjustments are made on an *arc* movement which provide *full bearing contact* in all positions.

That's why owners and operators say Baker Blades will take a beating and *stay solid*—without developing "play" or shimmy.

The complete line of Baker Bulldozers, Gradebuilders and Root Rippers—all easily *interchangeable,* too—is manufactured exclusively for Allis-Chalmers Crawler Tractors. Three mountings are available: engine-mounted hydraulic, frame-mounted hydraulic (the revolutionary 9-X "No Push Beam" 'Dozer) and cable-controlled types.

Call or write your Baker, A-C Dealer today—ask for *proof* why Baker is the better blade—dollar-wise—for *you.*

THE BAKER MANUFACTURING CO.
Springfield, Illinois




**Baker—The most versatile line of tractor attachments**


Detailed recommendations for maximum results in the installation of mainline and panel belts were presented by A. E. Long, general superintendent, Clearfield Bituminous Coal Corp., Indiana, Pa. Summing up, Mr. Long pointed out that belt conveyors are not a cure-all but that if properly installed and operated they can reduce haulage cost and, by taking advantage of the potentialities of concentration, mining cost as well.

**"A belt maintenance shop is essential to economic coal mining where belt conveyors are used."**

Independent commercial shops were advocated as the best method of attaining economy and efficiency in the maintenance and repair of rubber belting by W. A. Haslam, assistant to the vice president, The New River Co., Mt. Hope, W. Va. With a large volume of work, there is an opportunity to provide the necessary facilities and trained manpower—something that is difficult for an individual mining company with a smaller and intermittent work load. Some 4 yr of experience with such a shop in his area, said Mr. Haslam, has proved the soundness of this approach.

**"Every electrical failure was first a mechanical failure, and every mechanical failure was first a lubrication failure."**

Centralized lubrication by the Farval system to 600 points in the central cleaning and preparation plant of Dorrance Colliery, West Virginia Coal & Coke Corp., Omar, W. Va., was described by W. H. Carter, master mechanic. Mr. Carter's paper was the first at the session on power and maintenance Wednesday morning, E. R. McMillan, manager of coal operations, Northwestern Improvement Co., and T. R. Workman, vice president, West Virginia Coal & Coke Corp., presiding jointly.

In the lubrication system at Dorrance Colliery there is 4,000 ft of distribution line, Mr. Carter said. One oil and one grease handle the job. The system is a dual-header loop system, in which two lines are carried from the pump to a point close to each bearing, then back to the pump. Rollers of conveyor chains are lubricated with coal spray oil and by connections to the spray piping. Several other lubricants are required; namely, a grease for anti-friction bearings, which are lubricated on schedule by hand; two oils for the speed reducer; and another oil for the air compressor and shaker eccentrics.

When the eccentrics first were connected to the automatic greasing system, the consumption was high, operating temperatures were high and bearing life was unsatisfactory. After greasing was replaced by drip-feed oilers, those difficulties were eliminated and the weekly cost of eccentric lubricant was reduced from $16.83 to $5.52. Life of conveyor

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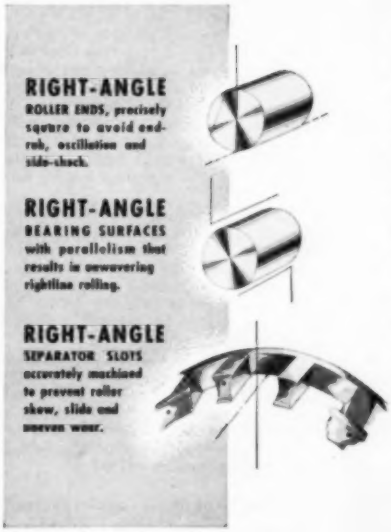
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chains has been extended and horsepower which were made in the company's shop. Measuring chambers feed a fixed quantity of oil at each stroke. A solenoid valve decreased by the spray-oil lubricators, ensures that chains get oil only when they are running, Mr. Carter said.

Answering questions from the floor, Mr. Carter said that he does not have data on labor savings made by the centralized lubrication system but understands that such systems have saved their cost in a year's time. By elimination of the lubricating jobs in the plant, inspection of equipment has not suffered because, as before, the company still employs inspectors. Even so, less inspection and less maintenance are required because lubrication is better. Though no men have been injured in lubricating equipment, Mr. Carter noted that the centralized system does obviate the need for sending men into close places.

Employing a two-man grease crew equipped with locomotive, supply car and grease truck and doing much of the greasing on-shift has been the outcome of long trials with other methods in Piney Fork No. 1 mine, Jefferson Coal Co., said Evan Adams, general superintendent. Eight mining units work on each of two production shifts and two units on development on the third shift. Four oilers are employed. Two of the oilers, using the locomotive and greasing equipment, work on the 4 pm shift and the other two, using the same locomotive and equipment, work on the 12 am shift. Loading machines are lubricated twice for each three working shifts. The greasing outfit has a trolleyphone and has priority over everything except main haulage. It usually takes 15 min to grease a loading machine.

Use of a greasing outfit manned by trained oilers saves lubricants, Mr. Adams said. The cost of lubrication materials—grease, oil and waste—runs 1.66c per ton. He did not recommend purchase of an expensive grade of hydraulic oil but he did urge that it be handled in closed cans to eliminate dirt.

Temperatures in Goodman loader gear cases were reduced 50 deg and maintenance was minimized by adding oil pumps producing circulation through a cooler. At this mine, 36 men comprise the entire maintenance department, including oilers, bit sharpeners and others.

### "The toughest underground power transmission problems originate in trailing cables used on mobile equipment."

Trailing cables on underground mobile equipment present the toughest problem and one that will be with mining as long as cables are handled carelessly, said Urban F. Toucher, chief electrician and master mechanic, Union Pacific Coal Co. His paper was read by I. M. Charles, chief engineer of that company.

Mr. Toucher touched only lightly on trailing cables but described in detail the steps from the power plant, generating 34,500 v, to the transformer substations

at the tops of boreholes, sending 2,400 v underground to the conversion units, and the DC transmission into the section.

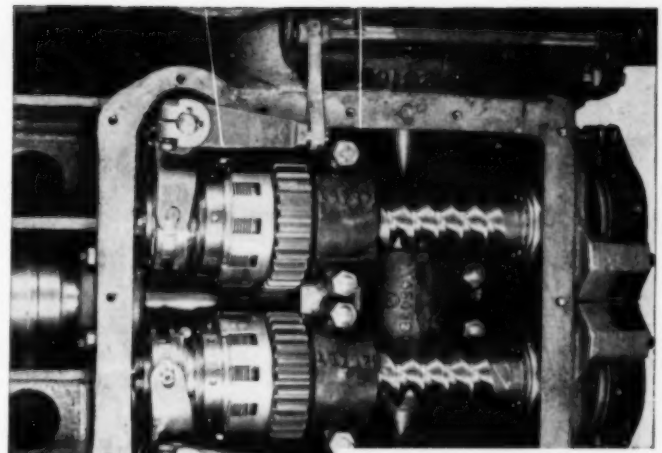
Underground cables carrying the 2,400-v power are three-conductor 4/0 rubber insulated, overall rubber belted and armored with steel tape, Mr. Toucher explained. They are hung on steel rings on ⅜-in galvanized messenger, which is mechanically continuous and is connected electrically to the cable sheath, rails, borehole casings and salt grounds placed every 500 ft. Conversion units consist of four 300-kw portable ignitron rectifiers and two 200-kw motor-generators operated in parallel. Paralleling is not difficult if distance between units is sufficient to overcome the over-compounding of the generator. It is not necessary to have reverse-current protection on the DC breaker of a motor-generator paralleled with a rectifier.

Each branch of the DC system is sectionalized from the main feeder by a switch and automatic reclosing breaker. Sectionalizing switches are placed at 1,500-ft intervals and have green lights to indicate their location. Hook or "hot" nipping is not a common practice in the mine. It has been displaced by approved clamping devices with fused switches and plugs in intake airways for all mobile apparatus. Frames of all off-track mining equipment are grounded to the negative feeder and to the whole low-resistance grounding mat of the mine by a third conductor to the power cable. This ground wire of the cable is attached to the ground system at a location remote from the negative feeder, Mr. Toucher added.

Mines of the Berwind-White Coal Co. have used a 550-v DC system for about 50 yr, said W. R. Wood, electrical superintendent. The company generates its own power at 6,600 v, transmits at that voltage to the closer mines and at 13,200 v to distant mines, the farthest of which is 13 mi away. All conversion is done by synchronous converters located on the surface. The 550 v is taken in through boreholes by 500,000-cm cables. As many as eight of these cables are placed in one 6-in steel-lined borehole. The cables are supported by the conductors. The deepest borehole is 1,040 ft.

Positive cables in the borehole are neoprene-jacketed and the negatives are triple-braid weatherproof, Mr. Wood explained. Abrasion at top and bottom of the casing is prevented by special bakelite bushings. Cables are installed in the boreholes separately and the tendency to twine when being lowered in the pipe is minimized by attaching a round piece of steel 2 ft long to the leading end of the cable. Soapy water applied to the last cables to go into the hole eliminates a slight wedging trouble encountered.

Cables removed from boreholes after several years of service have not shown the serious wear that might be expected from the movements that take place by reason of magnetic forces and expansion and contraction, Mr. Wood pointed out. One reason for the use of 500,000-cm cables instead of larger is the greater carrying capacity per unit of copper cross-section. One cable manufacturer ad-

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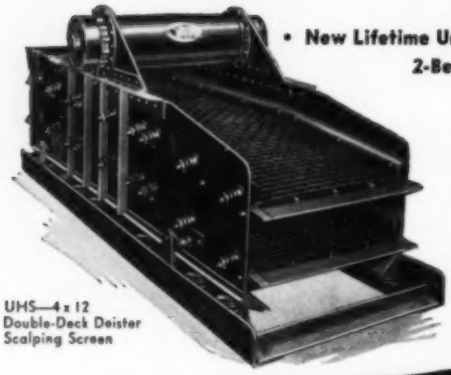

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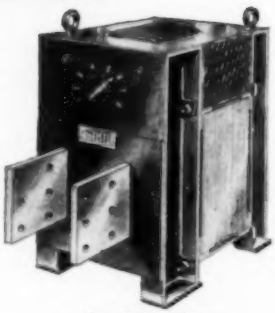

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vised that four 500,000-cm cables in a certain pipe size can carry 1,720 amp against only 1,350 amp for a 2,000,000-cm cable in a similar pipe.

**"Look after the maintenance of the continuous miners and the production of coal will be at a maximum."**

Maintenance of continuous-mining sections in the 41-in Upper Freeport and 56-in Lower Freeport seams was covered in a paper by G. W. Stump, assistant production manager, Rochester & Pittsburgh Coal Co. A typical production set-up employs two continuous miners, four shuttle cars and a 30-in belt. The Joy miners work in rooms driven on 25-ft centers and the Colmols in rooms on 50-ft centers.

A supervisor of maintenance with extensive and intensive training in maintenance is charged with the responsibility for all equipment at the mine except the preparation plant. His training includes mine and shop experience and observations of assembly work on machines at the manufacturing plants. Under him is a chief electrician, who is responsible for all underground equipment and who has had about the same training as the supervisor. Next come certain key men, such as flat-road men or shop foremen. They are good mechanics who carry on electrical and mechanical inspection and expedite repairs of equipment in any section. Each producing unit has a mechanic who is under direct supervision of the assistant foreman of the section.

Individual records showing tonnage and all information pertinent to maintenance are kept for the machines, Mr. Stump said. A summary is made weekly and a recapitulation monthly. The supervisor of maintenance and the superintendent study the reports to see that full advantage is taken of the report material.

Lubrication is done on-shift but is spread over the three shifts. That is, each mechanic is assigned specific points to lubricate. Most of it is done during the 30-min lunch period. Head-gear cases are checked at the beginning of the shift while bits are being set. Shuttle-car lubrication also is spread over the three shifts but in this task the mechanic is assigned to a specific car and much of the job is done while the cars dump their loads, Mr. Stump said.

Experience with the continuous miners indicates that certain parts, specifically cutting chains, conveyor chains, swing jacks and hoses, should be checked weekly. Other parts can go for longer periods. Only when a major breakdown occurs is an entire machine sent to the outside shop. When possible, units are taken off in the sections and sent to the outside for thorough overhaul.

Answering questions from the floor, Mr. Stump said that a continuous miner needs a general overhaul after producing about 100,000 tons and that shuttle cars require overhaul about every 3 yr.

**THE JULY ISSUE OF** *Coal Age*

# "DESIGN FOR MODERN MINING"

**will present a complete up-to-date appraisal of equipment, supplies and methods needed for lower costs, higher quality and greater safety.**

"Design for Modern Mining," the July, 1952, issue of COAL AGE, is designed to help the coal mining industry raise its efficiency in:

**1. DEEP MINING**
- Better mining and loading
- Safer roof support
- Faster, more effective face transportation
- Stepping-up main haulage capacity
- Modernizing power and electrification systems
- Improving auxiliary services
- Longwall and continuous face mining
- Mechanization of steeply pitching veins
- Auger mining and longhole drilling

**2. STRIP MINING**
- Improved overburden preparation
- Increasing stripping and loading capacity
- Modernizing spoil-haulage systems
- Increasing the capacity of coal-haulage systems
- Improving auxiliary services
- Extending the coal-recovery range

**3. PREPARATION**
- Using the most modern coarse-coal cleaning methods
- Adopting the most modern fine-coal cleaning methods
- Improved methods of drying
- Modernizing sizing and loading
- Improving auxiliary services

**The JULY issue, "DESIGN FOR MODERN MINING," is an unusual opportunity for manufacturers to tell the coal mining industry how *their* products can cut costs, step up quality and promote safety.**

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Complete plates: **June 15, 1952**
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*Coal Age*

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**"Any program of mechanization at our mine must adapt itself to the mine as it stands, since the mine cannot be redeveloped."**

When two Joy continuous miners now on order are installed to augment the three already in use, the entire production of Harwick mine, Duquesne Light Co., will be from continuous miners, said J. A. Younkins, assistant general superintendent, coal department. Mr. Younkins led off at the Tuesday afternoon session on continuous mining, with W. B. Jamison, vice president, Jamison Coal & Coke Co., and Stuart Jenkins, Bell & Zoller Coal Mining Co., presiding jointly.

With 48% of the Harwick mine's output in 1951 produced by continuous miners, tons per manshift was 7.3 against 6.46 in 1950, Mr. Younkins reported. The first continuous machine was installed in the mine in June, 1950.

Mr. Younkins pointed out that under good roof conditions in coal reasonably easy to cut, the Joy machine is well suited to complete pillaring with recoveries in excess of 85%. Instead of being worked open-ended, the pillars are mined by taking a cut, leaving a 10-ft fender, then slabbing it back, leaving small stumps until the lift is completed. Though timber is used rather than roof-bolting, roof-bolting may be used in the future, probably with hydraulic drills on the miner itself, to make the operation really continuous.

Comparative section costs per ton, July to December, between a continuous-mining unit and a conventional mechanical-loading unit were $1.283 for the miner and $2.002 for the loader. These figures include all maintenance labor and supplies as well as supervisory charges. Maintenance (supplies and labor) for the miner was 35.7c per ton. Deducting certain items that properly were chargeable to operation, the maintenance was 30.7c per ton compared to 22.5c for the equipment in a conventional loader section.

The continuous miner produces coal that is considerably finer, there being practically no plus 4-in and an increase of 50% in the proportion of the minus 48-mesh, Mr. Younkins said. Now, since an indicating device was added to the miners to show the operator the position of the head, the operator does not cut into top or bottom and thus produces a cleaner coal. As to power requirements, Mr. Younkins said that for a time three miners were operated comfortably from 700 kw of substation capacity and without difficulty for a short time on 500 kw.

**"Continuous mining means the uninterrupted flow of coal from the seam to commercial transportation."**

The BCR "Col-Burster," a full-face continuous mining machine, will provide flexibility with non-stop mining, said Gerald von Stroh, director, Mining Development Committee, Bituminous Coal Research, Inc. Showing photos of faces, headings and crosscuts driven with the machine, he listed the following advantages for a full-face machine:


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5. It probably produces cleaner coal because there is less tendency to cut into floor and roof.
6. The mass of the machine required to provide thrust for cutting a full face also provides better mounting for auxiliary equipment for roof control and ventilation.
7. Most of a banded impurity is removed in large pieces.

Tests from Nov. 1, 1950, to April 10, 1951, in a hard, dense Illinois coal with the Goodman mining-and-loading machine were described by H. C. McCollum, H. C. McCollum & Associates, Chicago. General specifications of the machine are: height, 34 in; overall width, 90 in; width of mining head, 42 in; overall length, 27 ft; approximate weight, 20 tons; recommended coal-seam height, 40 to 60 in; cut below floor level, 6 in; minable width of place without maneuvering crawlers, 18 ft; depth of cut, 18 in; distance of operator from coal face, 15 ft. The Illinois test came close enough to a designed average capacity of 2 tpm, including the complete cycle of sumping, cutting, pulling out and swinging the head, to indicate that the capacity can be attained. Size consist of the face product was 80% over ½ in.

Average for 70 shifts of operation with a Colmol in the Brock mine, Christopher Coal Co., working the 72-in Sewickley seam, was 504 tons per shift, or an average of 72 tons per man-shift, said F. R. Zachar, general superintendent. Conventional off-track mining with loading machines produced 460 tons per shift and 35 tons per man-shift. The Colmol deposits the coal on the mine bottom and pick-up to shuttle cars is done by a Joy loading machine, Mr. Zachar explained. Adding the Joy loader to the mining unit solved several problems, besides preventing interruptions. Shuttle cars now are loaded to capacity and the 2 tons of spillage per 25 ft of advance is cleaned up. The loader provides a means of handling the heavy, bulky cables of the continuous miners when it backs up, and a source of power for drilling rib holes for cable hangers.

When advancing at 18 in per minute, the Colmol requires 550 amp for its three 70-hp 250-v motors, Mr. Zachar said. This is supplied by two 500,000-cm cables. A third cable, 250,000 cm, provides a safety ground. Places are driven 16 ft wide in two lifts, one 9 ft 6 in and the other 6 ft 6 in. This 16-ft width enables the operators to drive 90-deg crosscuts. When the entries have been driven to the back of the property, the company expects to produce in second mining at least 600 tons per shift and to get 85 tons per man-shift. Comparative size consists produced by the Colmol and conventional mining are as follows: 4x2-in, 9.6% and 18.7%; 2x1¼-in, 8.6% and


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Milton H. Fies, manager, coal operations, Alabama Power Co., presented a comprehensive paper on the favorable and extensive experience with Joy continuous miners at the Gorgas mine (p 76, this issue). With only three of the Joy miners in operation, the safety record of the mine was greatly improved, production per man-day doubled and cost per ton of coal reduced in spite of higher wages and higher cost of materials.

**"A new non-explosive device for breaking down coal has been developed to a point where extensive trials have been conducted."**

Chemechol, du Pont's new device for breaking coal, eventually will be competitive with other methods and devices and in many mines may offer substantial savings, said R. D. Hedreen, assistant manager of sales, E. I. du Pont de Nemours & Co., Inc. The new device has undergone extensive field tests but as yet is available only in limited quantities because of the shortage of alloy steel for tubes. Mr. Hedreen was the first speaker at the new-developments session Tuesday morning, with C. E. Lawall, assistant to the vice president, C. & O. Ry, and L. J. Redding, personnel division, Rochester & Pittsburgh Coal Co., presiding jointly.

Mr. Hedreen described Chemechol and summarized experience with it in Illinois mines of the Freeman Coal Mining Co., Peabody Coal Co. and Franklin County Coal Corp. A chemical heated by 6 to 9 amp passed through a nichrome starter wire produces a gas pressure which, at 18,000 to 22,000 psi, shears a disk and thus releases the high pressure into the hole. Development was aimed at filling the need for a coal-breaking device safer than permissible explosives. At the present time, the USBM is establishing a background for writing a schedule for officially testing Chemechol for permissibility.

Chemechol was developed from research for a non-explosive product that would come as close as possible to fulfilling the following requirements: (1) eliminate electric squibs and electric blasting caps; (2) eliminate high pressures in tubes or lines outside the borehole; (3) emit no spark or flame; (4) produce no noxious gases; (5) eliminate disaster hazards even if the device was misused; (6) produce the breakage desired in modern mines; (7) be economical and convenient; and (8) meet legal requirements of certain states for on-shift use.

Steel tubes are approximately 54 in long and 2 1/16 in in diameter, Mr. Hedreen explained. The chemical mixture (about 1¼ lb) comes in a paper shell 1 in in diameter by about 40 in long. The gaseous products emitted are about 50% steam, the remainder being principally nitrogen and carbon dioxide. Noxious gases total only about 20% of the upper limit of Class A permissible explosives.

**MODERN MINING *demands* PROTECTED CABLES**

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**ASPHALT AND ASBESTOS BUILDING MATERIALS**

**"A satisfactory system of continuous longwall mining with excellent roof control has been established."**

A Samson Stripper is recovering a 300-ft pillar on a retreating longwall face in the 38- to 42-in Lower Kitanning (B) seam of the Barnes & Tucker Co., said Richard T. Todhunter, Jr., general manager of that company. The machine, made by Mavor & Coulson, Ltd., Glasgow, Scotland, plows or wedges a 2-ft slice of coal onto a double-chain face conveyor. It moves forward by strokes 2 ft 7 in long. Propulsion is by hydraulic jacks built into the machine, which in turn is anchored to floor and roof by additional hydraulic jacks during the forward stroke. In the Barnes & Tucker mine, the plowing or wedging is preceded by a top cut made with a longwall cutter, also built by Mavor & Coulson. Speed of the complete cycle for each 2-ft 7-in stroke is 24 or 34 sec, depending on the thrust applied.

Principal specifications of the stripper are: length, 18 ft 9 in; width, 2 ft 7 in; height, 41½ in; vertical jack range, 10 in; motor, 30 hp. The face conveyor is flexible and is snaked over by compressed-air cylinders installed at 20-ft intervals.

A rigid breaking-off line to obtain total caving, leaving no support in the waste, is secured by use of fabricated 24x26-in chocks spaced on 5-ft centers.

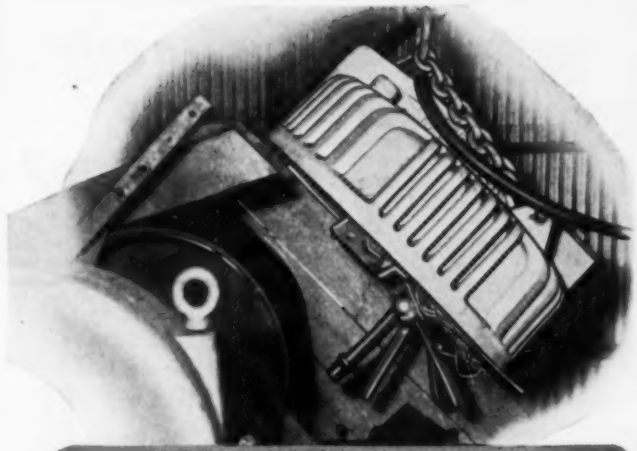
The steel base is 2 ft high. Wood blocks above are released for moving by knocking up a catch on a release at each corner. With the cutter, the width of the strip of coal removed averages 30 in, producing 110 tons per strip at an average rate of 70 tph. It has been determined that a face at least twice the present length of 275 ft is desirable for the machine. This would give an output of 275 tons per shift or 25 tons per man against a present 15 tons.

Among other conclusions, Mr. Todhunter pointed out that the stripper:

1. Permits positive roof control, giving better safety to men and equipment.
2. Reduces dust.
3. Permits total extraction of pillars with long life for each set-up.
4. Requires no mobile equipment.
5. Reduces power consumption.
6. Conserves supplies, particularly supports and explosives.
7. Produces a cleaner coal and coarser product.

**"In the next 10 to 20 yr, pressure will be brought to bear on the coal industry to get practically 100% recovery."**

Ten days' recent highly favorable experience with a Mecco-Moore longwall machine in Crichton No. 4 mine, Johnstown Coal & Coke Co., in the 38- to 42-in Sewell seam, Nicholas County, W. Va., was summarized briefly by A. B. Crichton Jr., vice president of the company. This machine, equipped with three cutter bars, is working on a 550-ft retreat-

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Stearns Suspended Separation Magnets are powerful units for removing tramp iron from various kinds of conveyed materials where protection to crushers and other processing machinery is necessary. Eliminating foreign metal means fewer repair bills on crushing equipment, fewer shutdowns and higher production.

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A Morris Type R is capable of operating under suction lift . . . positive head not required! This design feature lets atmospheric pressure do its work — and in many instances it's sufficient to clear the stoppage. Shutdowns and dismantling of pipe lines are greatly reduced.

And when there are cases calling for pump dismantling, the job is relatively simple with Morris Type R. By loosening four bolts, off comes the end cover — and you can take a quick look at the inside. Unscrew the impeller, if necessary. But you don't have to disturb the pipe line at all.

Small wonder Morris Type R is so popular in coal conditioning operations. Flow is maintained so reliably with slurries of all consistencies that a lot of operating problems are answered. Get the full story of this many-feature pump. Write for Bulletin 181.

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ing face. It mines 80 tph and produces 25 tons per man in the section. Morton Gullick, Sheffield, England, representing Mavor & Coulson, Ltd., manufacturers of the machine, assisted Mr. Crichton in his presentation.

Mr. Crichton dealt mostly with the increasing necessity for better recovery, the greater possibilities of longwall mining and the basic principles of the longwall system. In the next 10 to 20 yr, he said, pressures will be brought on the coal industry to get practically 100% recovery. He explained how a pressure arch exists on a longwall face and how the width of the arch can be predicted.

**"The planer will cut friable coal with overall satisfactory performance and reasonably good productivity."**

Experiments with a German coal planer in a southern West Virginia mine were described by Wilbur A. Haley, mining engineer, USBM. Since November, 1951, the planer has been working in a 328-ft block of coal 31 to 36 in thick in the Pocahontas No. 4 seam. This seam consists of friable coal and lies nearly level .Though not all problems have been solved, the results are encouraging and indicate that the planer will cut this friable coal satisfactorily with reasonably good productivity per shift.

The panzer, or face conveyor, is flexible and is moved and held against the face by pneumatic shifters, Mr. Haley explained. An endless chain pulls the planer along the face at 75 fpm, which is half the speed of the panzer conveyor. Roof is controlled by recovered wood cribs, 8 to 12 ft apart, and by mechanical jacks, which yield 2½ in under a load of 40 metric tons. After complete yielding, they will support a direct load of 90 metric tons before failing.

Nineteen Dosco continuous miners on long faces will be in use by the end of 1952 in mines of the Dominion Steel & Coal Corp., Sydney, Nova Scotia, said Louis Frost, chief mining engineer, whose paper described the machine and its operations (*Coal Age*, Oct., 1951, p. 82). A shaker conveyor first used to take the coal from the machine has been replaced by a 30-in flat belt conveyor operating at 350 fpm to accommodate the 4½ to 8 tpm which the Dosco miner delivers at the peak of each operating cycle. The cycles are completed in 31 to 47 sec. Four Mark II machines incorporating improvements over the original Mark I already are in operation. Maneuverability has been improved, the cutter head has been revised to eliminate spillage and the short transverse chain conveyor has been replaced by a belt with variable-speed drive up to 300 fpm.

The coal industry will accept underground auger mining, A. J. Opperman, consulting engineer, Uniontown, Pa., predicted. Summarizing the advantages of this type of mining, he listed the following:

1. High ultimate recovery, and greater recovery where severe roof conditions

prevail in underground mining operations.

2. Lower initial and overall cost of mining equipment.
3. More and faster producing sections.
4. Consistent daily average tonnage.
5. Better control and concentration of men and supervisors.
6. Higher output per man employed.
7. Elimination of conventional timbering, cutting, drilling, shooting and loading methods.
8. Elimination of timber and explosive costs for 50% of the coal recovered over the life of the mine.

## *Stripping and Land Restoration*

**"Better fragmentation not only means faster digging but also less wear and tear on equipment."**

A column of explosives does not detonate instantaneously, the point of initiation of a charge is important, and the proper use of milli-second delays can boost blasting efficiency and improve overburden action. These were some of the conclusions drawn by John L. Romig, Technical Div., Atlas Powder Co., from photographic studies of blasting practice made with a 5x5-in battery-powered machine-gun camera. The camera, taking three photos per second with exposure time of 1/450 sec, provides detailed study of blast behavior. Frank F. Kolbe, president, The United Electric Coal Cos., presided at the session.

In shooting vertical holes, starting the explosion at the bottom of the hole confines the explosive better and gives the explosion a better chance to displace and break the overburden, Mr. Romig explained. With blasts started near the top or front of the hole, geysers of escaping gases show that the explosion is less confined. In some blasting, this latter condition may be desirable, especially if the resulting lift provides space for the remaining material to be moved to prevent undue degradation of the coal.

A little extra time spent in providing adequate stemming is time well spent. Good stemming confines the charge and thus gets the most efficient use from the explosive used.

Turning to milli-second delays, Mr. Romig cited the following advantages for this type of blasting:

1. Better fragmentation.
2. Improved displacement.
3. Reduced vibration and noise.
4. Controlled throw.
5. Reduced backbreak.

Discussing Mr. Romig's paper, Fred Horne, chief blasting engineer, Sinclair Coal Co., said, "There's no such thing as a bank that's too well shot." Explosives men must base their procedure on their own experience and the conditions they meet, Mr. Horne said. He took issue with Mr. Romig on the question of electrical detonation, pointing out that fuse-detonated explosives sometimes do a better job for less money if the conditions are right. With fuse-detonated explosives, the blast can be controlled from outside the hole and there is no danger from primers left inside the hole.

The true criterion of blasting efficiency is the daily report of yardage moved, Mr. Horne said. A little more money spent on explosives and blasting may save a lot of money on maintenance and repair of equipment. He urged explosives manufacturers to develop a tamping plug for large-diameter holes at reasonable cost—a plug that will perform well in a wet hole.

**"If you're not satisfied with your haulage roads, look around."**

Experiments by his own company and tests by Purdue University can help strip operators make the best use of materials available for building haulage roads, said S. F. Sherwood, general manager, Central Indiana Coal Co. Citing an increase of 26% in tonnage hauled, with the same number of trucks operating over the same distance from pit to tipple, Mr. Sherwood listed the following factors that spell the difference between good and unsatisfactory haulage roads:


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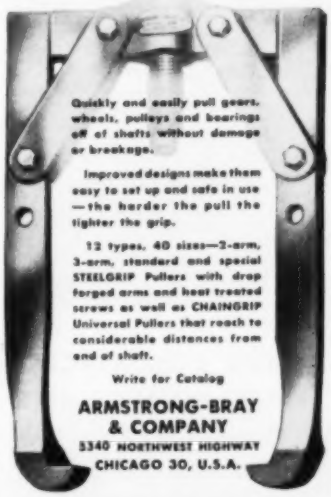
GEAR and WHEEL
PULLERS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At the Bessemer Limestone and Cement Company, Bessemer, Pa., one McCarthy unit averages 90 ft. per hr., working through a facing of blue shale 34 ft. deep. Holes are drilled on 18-ft. centers. Two men handle the whole job, including setup and moving. Another McCarthy unit has been installed in a different section of this quarry and it, too, is breaking all previous records for fast, low cost shot hole drilling. McCarthy Drills operate with all types of power units on all types of mounts. Write today for full facts about this finger-tip controlled money saver.

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with the MERRICK FEEDOWEIGHT, a self-contained automatic conveyor scale, with automatic gate for feed rate control. Powered feed regulator operates gate, without restraint on scale beam. Uniformly feeds bulk material BY WEIGHT; automatically totalizes weight of materials fed. Simple to operate. Slow moving parts mean long life. Easy to install, maintain.

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**1. Grain size**—Laboratory tests showed that the grain size of the shale being used for roads was too large for satisfactory base material.

**2. Density under standard techniques of compaction**—Maximum density is desirable.

**3. Freeze-thaw characteristics**—The critical question is: How much moisture will the material absorb from the bottom when it thaws? Minimum absorption, of course, is desirable.

**4. Weight-supporting characteristics**—The California Bearing-Ratio Tests can help determine what combination of materials will serve best for road-building in terms of expected loads and weather conditions.

For low-cost haulage and sustained production, strip-mine haulage roads must be well built and well maintained. "If you're not satisfied with your haulage roads, look around. There may be other materials available which, upon test, will give you better service," Mr. Sherwood said.

**"By the use of vertical drilling, we have been able to strip areas that otherwise would be impossible."**

How can you best handle heavy overburden, ranging up to 90 ft or deeper, containing massive limestone that runs some 20 ft in thickness, a heavy bluestone and a 20-ft-thick sandstone? That was the question faced by Hanna Coal Co., St. Clairsville, Ohio. J. S. Harmon, superintendent of stripping, told how the company did it.

"We converted from horizontal to vertical drilling within the past year," Mr. Harmon explained. He cited the following conditions leading to the change:

1. Overburden of excessive height could not be satisfactorily prepared with side drilling.

2. Better fragmentation was needed.

3. Concussion and blast propagation waves were worrisome with horizontal shooting.

Vertical shooting solves these problems and, besides, offers the advantage of a less crowded pit, an increase in drilling speed (on a footage-drilled-per-shift basis) and improved performance by the stripping shovels.

Hanna now operates six rotary air-cleaning vertical drills made by Joy Mfg. Co. These drills have been modified by lengthening the mast to 52 ft, installing a drill-stem guide at the midpoint of the mast, thickening the jaws of the rotary jaw chuck assembly, mounting the chuck-jaw shifter-sleeve fingers on a pin assembly to make them replaceable, increasing the speed of the suction fan, enlarging the rotary drive spindle to allow passage of an 8½-in bit, addition of air-operated tramming clutches and brakes, and installation of an emergency hand brake. The type of bit to be used still is an open question. The answer will depend upon the economics of the fast-drilling short-life soft-rock bit against the slower-drilling longer-life hard-rock type.

"By the use of vertical drilling we have been able to strip areas that otherwise would be impossible. The increased speed of rotary drilling with air cleaning of the holes over the old-fashioned churn types has made available many acres of stripping lands that formerly were classified as an unprofitable venture," Mr. Harmon said.

Anthracite strippers depend mostly on vertical drilling, said Talhurst Butler, Central Pennsylvania Quarry Stripping & Construction Co. Though the size of drill holes has increased substantially over a period of years, blasting practices have not changed greatly. The hard rock lying above the coal together with frequent severe pitching of the seams makes drilling slow and dictates vertical rather than horizontal drilling.

For this vertical drilling, Joy rotary air-cleaning drills are finding wider acceptance in the anthracite field, Mr. Butler said. Based on 1,626 hr of operating time for a Joy rotary drill against 3,234 hr for a conventional churn drill, the rotary operation drilled 7 ft per hour against 2.2 for the churn drill, achieved 190 ft of hole per bit against 5.2 hr between sharpenings for the churn drill, and prepared 50.5 yd of material per hour against 22.5 for the churn drill. In addition, the labor charges with the rotary drill were 55% less than for the churn

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**Youngstown 1, Ohio**

drill and bit cost per cubic yard was considerably less.

Similar tests with an Ingersoll-Rand Quarrymaster drill, converted to rotary action, showed improvements of about 50% over churn drilling. Mr. Butler said that rotary drilling has four major advantages, as follows:

1. Higher production.
2. Lighter bits.
3. Stemming material provided at the hole by the machine itself.
4. No need for water.

**"Today, stripping depth averages approximately 70 ft and maximum of about 90 ft. Ten years from tomorrow, What?"**

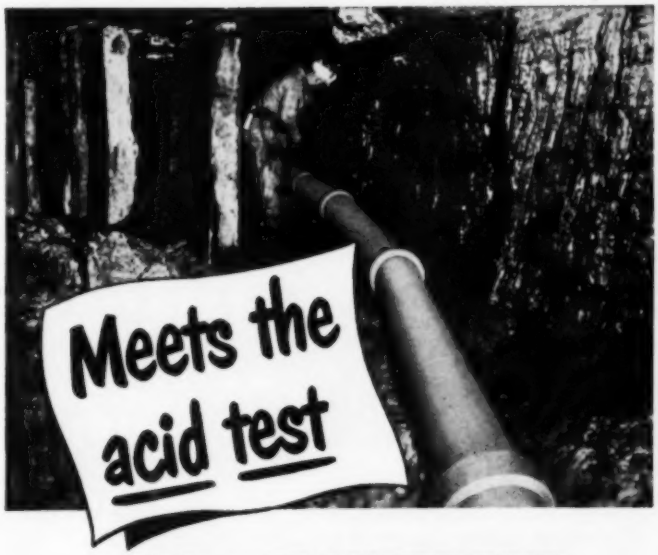
Widely differing stripping plans and practices to meet different strata and geological formations, together with the units and combinations of units used, were described by Arthur F. Lee, district engineer, Truax-Traer Coal Co., at the Tuesday afternoon stripping session. George A. Roos, vice president, Philadelphia & Reading Coal & Iron Co., presided at the first half of the session, devoted to mining operations, and Thomas C. Cheasley, assistant to the president, Sinclair Coal Co., guided the second half, which was given over to land reclamation.

Mr. Lee described operations at six strip mines, as follows:

**1. Burning Star No. 1, Truax-Traer Coal Co., DeSoto, Ill.**—This operation underwent several changes during its life. With overburden consisting of rock, shale and a surface layer to a total depth of 50 to 60 ft, stripping was done by shovel and dragline in tandem, working on the coal. A good deal of time was lost when the two units passed each other in the pit. Tandem operation was abandoned some years ago, when shovel makers began building much bigger machines.

**2. Buckheart No. 17, The United Electric Coal Cos., Canton, Ill.**—The mine is worked with three stripping units—a Marion 7400 dragline, plus a Bucyrus 950 shovel and a wheel excavator working in tandem. Overburden can be handled mostly without shooting, and the wheel excavator can remove all overburden down to within 23 ft of the coal. The shovel digs a 50-ft wide cut. The wheel excavator follows with a 60-ft cut, leaving a 10-ft safety shelf on the highwall. When the shovel reaches the end of the pit, it starts stripping in the opposite direction below the bench made by the wheel. The excavator follows, making a new bench for the shovel to take when it reaches the other end of the pit. The pit being 90 ft wide, the units pass each other on the coal near each end of the pit. Monthly performance for the 950 shovel averages 700,000 cu yd of material; for the excavator, 500,000 cu yd.

**3. Enos Coal Mining Co., Oakland City, Ind.**—This operation uses a combination of shovel working on top of the coal and dragline working on the spoil. Overburden consists of a complex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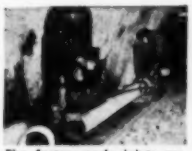

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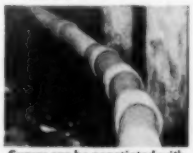

**Curves can be negotiated with Transite Mine Service Pipe. Deflections up to 5° can be made at each joint.**

**Tough, strong asbestos fibres help give this pipe many of its outstanding qualities.**

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stratification of shale, limestone, sandstone, slate and surface material. Features of the operation are:

1. A 1050 stripping shovel advances, leaving a 30-ft berm and excavating to a width of 50 ft, placing overburden on the spoil bank. The 5W dragline takes surplus spoil away by rehandling, making a roadway for the next cut and wasting the surplus.

2. The highwall is shot ahead of the shovel in such a way that a great part of it is thrown over on the berm and much of it some of the way across the cut, thus relieving the shovel of some yardage that it otherwise would have to handle.

3. The shovel does not clean up the berm for haulage trucks.

4. Haulage trucks do not pass by the stripping operations.

5. The coal is loaded retreating, so as not to interfere with the shovel.

**4. Chieftan No. 20, Maumee Collieries Co., Riley, Ind.**—This operation handles about 85 ft of overburden and operates in two pits, one on each side of the main haulage road. One pit is worked by a 5480 shovel and a Lima 802 dragline; the other, by a Bucyrus 1150 dragline. Each of the strippers advance the pit in only one direction, excavating from the haulage road until it reaches the end, about ½ mi away. As it advances, it also makes a bench on the highwall side, from 180 to 200 ft wide. On this bench the stripper returns, deadheading to the haulage road to start over again. Churn drills also work on the bench. Average monthly performance of the 1150 is about 800,000 cu yd.

**5. Harmattan mine, Fairview Collieries Co., Danville, Ill.**—Though a thick layer of hardpan underlying the surface means a good deal of trouble with water, there is no limerock or sandstone. Thus no blasting is needed. Two draglines are used—a Bucyrus 1150-B with 25-yd dipper and a 1250-B with 30-yd dipper. The draglines, working on each side of the haulage road and at right angles to it, start stripping at the road and work out from it in opposite directions to a distance of 1,500 to 2,000 ft. Each excavates an open cut 120 ft wide at the bottom, at the same time taking 15 to 20 ft of the soft overburden for a width of about 120 ft. This makes a bench for the dragline to travel on as it deadheads back to the haulage road to start a new cut. The coal loader follows the dragline, taking out the 120-ft-wide strip of coal in three parallel cuts about 40 ft wide and 150 to 175 ft long. The first of these three cuts is taken on the spoil side to preclude danger from slides. The wide cut also permits trucks and other pit equipment to maneuver freely. The loading shovel shuttles back and forth between the two pits to keep itself in coal. With overburden averaging 70 to 80 ft, each of the draglines handles from 500,000 to 700,000 cu yd of material per month.

**6. Georgetown No. 12, Hanna Coal Co., Cadiz, Ohio**—Because of steep hillsides and deep valleys, stripping generally is done on the contours. The coal frequently outcrops. The big stripping shovel—one of four 46-yd or larger shovels—opens the pit on or near the cropline

and strips back and forth along the contours, maintaining as far as possible an outside curve for the spoil. Haulage roads are changed frequently to keep trucks from having to pass the shovel. As the pit is decreased in size, the highwall is maintained on each side of the ridge parallel to the contour line. Near the curved end of the pit where the maximum depth is made in crossing the ridge, the pit is brought to an apex at the ridge so as to gain spoil room. Depths of over 85 ft sometimes are reached in crossing. Each of the four shovels averages about 1,100,000 cu yd per month. Maximum for one shovel for one month was 1,505,000 cu yd.

Citing the advances made in increasing stripping depth over the past 10 yr, Mr. Lee raised the question: "What depth will we be stripping 10 yr from now?"

**"As the supply of coal from relatively shallow and low-ratio stripping operations becomes depleted in the anthracite field, . . . our efforts must be turned toward the deeper and higher-ratio pits."**

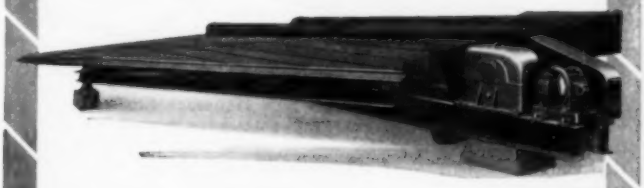
Pointing to the fact that pits more than 2,000 ft in width and 300 ft deep are not uncommon in anthracite stripping, Paul Goddard, vice president, Carey, Baxter & Kennedy, stated that even the largest draglines in use today are no longer economically practicable and that hauling equipment of one sort or another must be used to remove and dispose of overburden.

To illustrate the problems and methods of anthracite strippers, Mr. Goddard turned to the Greenwood Forty-Foot Mammoth stripping of Lehigh Navigation Coal Co., Tamaqua, Pa. The section now being worked calls for the ultimate removal of 41,000,000 cu yd of overburden with an expected coal recovery of 6,000,000 tons. Ultimate depth of the pit will be 700 ft. Total area will be 102 acres, some 3,100 ft long by 1,600 ft wide.

To prepare for operations prior to the start of stripping in 1946, the company carefully plotted sections at close intervals and obtained data from vertical and angled diamond-drill holes, churn-drill holes and records from underground mining. The stripping was planned in a series of steps that would result in release of a body of coal concurrently with the progress of stripping.

Present operations have carried the pit to a depth of 325 ft. The next 225 ft will be removed without substantial changes in methods. The final 150 ft of depth, mostly coal, may be removed by a 9-W Bucyrus-Monighan dragline with a 200 ft boom. Thus far, the equipment has included the following: two 170-B Bucyrus-Erie 6-yd shovels, one 120-B Bucyrus-Erie 4-yd shovel, one 54-B Bucyrus-Erie combination shovel and dragline, ten 42-T Bucyrus-Erie churn drills, 34 20-yd rear-dump diesel trucks, two D-8 Caterpillar tractors and one


## Many "Little Things" Add Up to BIG SAVINGS



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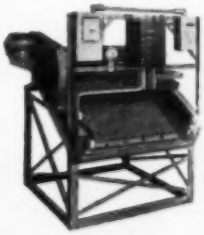
The time-proved anti-friction bearing head motion . . . operating at minimum current consumption, the factory aligned under-construction and the long-life deck covering and riffles, all effect economies that add little by little throughout the operating year to total savings that further explain why SuperDutys have been a part of every important table installation in recent years.

For full information, ask for Bulletin 119.



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Model 12 Caterpillar motor grader, together with auxiliary units.

Stripping is done in three 7-hr shifts, Mr. Goddard reported. Shovel-cut benches are 30 ft high and about 100 ft wide, providing running and turnaround space for trucks. The 170-B's load overburden only. The 120-B is used for loading overburden and coal. The 54-B loads coal on a single- or double-shift schedule. Normal coal output is 3,000 tpd.

The churn drills use 9-in bits and work three shifts per day to keep ahead of the shovels. Holes are drilled 35 ft deep, with an average of 38.1 ft of borehole per drill per shift. Holes are carefully located and plotted. Fine material hauled in from nearby refuse banks is used for stemming. The operation has averaged 0.72 lb of explosive per yard of rock moved.

Anthracite is rapidly approaching the point where there will be no more anthracite available in shallow, low-ratio pits, Mr. Goddard observed. Therefore efforts must be turned to deeper and higher ratio pits. "The large dragline which came in some 20 yr ago served as a temporary means of successfully operating some of these more extensive pits. But now there are few of these units that are not worked in conjunction with haulage equipment. Many operations are simply 'haul' jobs. Many more must be planned as such if the industry is to continue to flourish," he concluded.

**"Through proper land use, strip land can be an asset to the community's agricultural economy."**

Land reclamation work of The Pittsburg & Midway Coal Mining Co. is directed at: (1) improving farm lands adjacent to mining operations but not containing workable coal, and (2) utilizing and developing the mined land through a long-range and carefully planned rehabilitation program, said Frank J. Foresman, personnel director. These activities are conducted on more than 17,000 acres owned by the company, some 5,000 of which has been stripped.

Land rehabilitation consists mainly of reforestation, planting to forage crops, and impounding and conserving water. Hardwoods and fruit trees have thrived on the stripped lands, growing even larger than normal because the loose soil favors stronger roots and better moisture conditions and because trace minerals are brought up near the surface, Mr. Foresman explained.

Though forestation has been successful, the company now converts all its stripped land to pasture and only maintains those areas planted earlier with trees. Research still is continuing on ways to make better pasture land. One discovery is that it is not necessary to wait two years or so before seeding stripped land. The company now seeds banks immediately after stripping, with good results. Special equipment has been designed for this purpose. Grading of the banks is held to a minimum—only suffi-

cient to provide access roads—because grading compacts the earth, causing baking and erosion and destroying the wick action of the loose soil. Sericea lespedeza and birdsfoot trefoil have shown best results thus far, with perennial rye and Kentucky 31 fescue showing good promise.

Grazing is conducted on three farms and green forage crops now feed cattle from April 1 to Nov. 1, Mr. Foresman said. Cattle fed on the strip lands look like grain-fed cattle. Water impounded in abandoned pits provides an adequate supply even in dry periods and is believed to have lifted the water table considerably in the surrounding territory. A by-product of the company's use of stripped land is the production of honey from clover sown on the banks.

Adjacent lands not mined are planted to wheat, corn, oats, soybeans, sweet clover, grain sorghums, prairie hay and pasture crops. These lands, now being share-cropped, are increasing in value and yielding larger profits. An extensive fertilizer program is under way, with the company paying half the cost of the fertilizer used. Recreation areas, with lakes and camp sites, are being rapidly developed on the stripped lands. Game fish—even trout, which are accustomed to colder water—thrive in the man-made lakes.

Rehabilitation work requires careful planning and research, Mr. Foresman concluded. Every stripped area must be studied to determine its best use. Factors to be checked include soil classification, bank characteristics, local land needs, climate and economic feasibility.

Reviewing the work and achievements of the Land Use Technical Committee, Larry Cook, executive director, Ohio Reclamation Association, explained that the group always has sought to operate on the principle of land reclamation, bearing in mind the fact that the organization represented the producers of coal. The organization, working with representatives of the National Coal Association, with considerable overlapping of membership, has tried to represent the strip-mine operator as a dealer in a natural resource and as a contributor to the national welfare. A new statement of policy now has been drawn up and is being circulated among affiliated groups for approval, Mr. Cook said.

L. E. Sawyer, member of the Land Use Technical Committee and director, Forestry Div., Indiana Coal Operators' Association, remarked that in the past year little legislation has been introduced in state lawmaking bodies that would affect coal strippers adversely. He was followed by A. J. Christiansen, executive secretary, Illinois Coal Strippers' Association, who explained the present status of litigation over a county law that forbids stripping altogether. Constitutionality of the law has been challenged by the association and others, he said.

It's not enough to spend time on land reclamation, said R. L. Ireland, chairman of the executive committee, Pittsburgh Consolidation Coal Co. Unless the strip-


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*See our four-page insert in the Mining Catalogs*

# WHERE IN THE WORLD?

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**MANUFACTURERS—DESIGNERS—ENGINEERS**

ping industry wants to fight a rear-guard action, as it now is doing with respect to land reclamation, the industry must get busy with control of stream pollution, he warned. An interstate compact for the purification of streams now is effective in several states along the Ohio and other rivers and will be used to restrict coal strippers unless they take quick and effective action.

## Safety and Health for Miners

**"Keep your house clean—that means more in eliminating underground belt fires than anything else I know of."**

Belt conveyors generally contain three flammable properties: the belting itself; oils and greases used for lubricating rolls, idlers and drives; and electrical cables and insulations, said C. W. Thompson, manager, Weirton Coal Co. Mr. Thompson's paper, read in his absence by H. A. Opperman, consulting engineer, who also collaborated in its preparation, was the first in a series of safety discussions at the Wednesday morning session. J. T. Parker, superintendent, Inland Steel Co., presided.

To prevent fires to underground belts, coal companies must investigate the cause of every fire, eliminate the cause or provide protective devices that will prevent firing when causes cannot be eliminated; and adopt a standard set of rules covering operating procedure, Mr. Thompson said.

Citing actual fires that originated in or near belts, Mr. Thompson pointed out that the leading causes are: (1) friction at the drive or idlers because of faulty alignment, heating arising from stalled belt, obstruction in the belt, or torn or broken belt; and (2) mechanical and electrical defects, including faults in the starting mechanism, improper installation of electrical service and short-circuiting of parallel power wires.

Mr. Thompson suggested operating standards in six categories, as follows:

1. **Cleanliness**—All belt entries should be kept clean of loose and accumulated material such as dust, oil and grease. Breakthroughs should be kept clear of obstruction, especially where stoppings are provided with doors. Periodic inspection and reporting should be scheduled.

2. **Drainage**—Belt entries should be free of standing water, dripping water and mud.

3. **Timbering**—Though local conditions must govern, all timbering should at least meet minimum standards of state law and federal codes.

4. **Dust control**—Rockdusting should meet or exceed minimum requirements of state law and additional rock dust should be stored at strategic points. Dust


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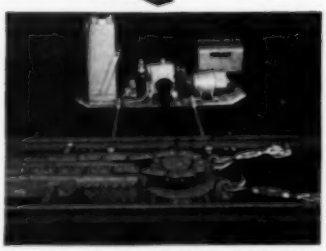
The Crown Mine, operated by the Freeman Coal Mining Co., represents many new firsts that are of utmost importance to the coal industry. Its record capacity of 800 tons of washed coal per hour is attained with the help of four NOLAN Porta-Feeders, the industry's newest and most efficient equipment for spotting cars for loading.

The Porta-Feeder mounts between the rails on top of the track ties, secured by jacks that permit quick movability. Little or no excavation or preliminary foundation work is necessary. The drive is on skids and is connected to the gear head by a strong universal joint and propeller shaft assembly. A sealed drive head allows operation in water up to the base of the rails. Reciprocating pushing dogs deliver constant forward feeding motion.



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controls should be set up to eliminate pollution of the air current.

**5. Man trips**—To protect belts and men from fire and other hazards, there should be ample clearance along the entry at all loading and unloading stations. Minimum distance of 6 ft should be maintained between men riding belts, with minimum overhead clearance of 18 in. When men travel on belts, side rollers or side obstructions should not be used. Belt crossovers should be provided and loading and unloading stations should be well lighted. Man-trip speed should not exceed 125 fpm and remote-control switches should be installed every 300 ft and marked with lights. Two men should be in charge of stopping the man trip at its destination.

**6. Electric controls and power lines**—Automatic devices should be installed to prevent motor overloads and warn of belt slippage, breakage or fouling and choking or pile-up at transfer and discharge points. There should be lockout controls to ensure safe maintenance and repair. All power lines for belt drives should be installed in an adjoining intake entry and placed in conduit. Other power lines should be enclosed in fire-resistant rubber-jacketed portable cable. Fuses should be adequate.

Turning to ventilation Mr. Thompson urged that all belt installations be on a separate intake ventilation split and that incombustible stoppings be built between intake and return, provided with incombustible self-closing doors at 300-ft intervals. Water lines also should be provided with taps at 300-ft intervals and 150 ft of hose at each tap, together with 25 bags of rockdust. Two all-service masks should be provided at drives, tail end and discharge and loading points.

Discussing Mr. Thompson's paper, J. W. Hardy, Goodman Mfg. Co., reported that several rubber companies are making advances in flameproofing rubber belts and power circuits. To reduce fires caused by belt slippage, he urged that pulleys be lagged. Though belt manufacturers can do much to prevent belt fires, such fires will never disappear entirely without sound operating practices, adequate training for men and good housekeeping, he said.

Further discussion was offered by D. A. Winstauley, deputy chief coalmine inspector, National Coal Board, London, England, and Richard Maize, Pennsylvania Secretary of Mines. Mr. Winstauley stressed the danger of emission of flammable and noxious gases from flame-resistant belts. He reported that the British now are installing detectors that warn of excessive heat, belt slippage and tears in the belt. Often, he said, when a hot idler is thought to have ignited a belt, the truth is that the idler has ignited coal dust or oil, which in turn has ignited the belt. These conditions, he explained, make good housekeeping essential.

Mr. Maize, recalling that he had urged the use of flame-resistant belts and trailing cables for many years, pointed out that Pennsylvania is the only state having a law that requires these


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materials. He suggested also that installation of automatic sprinkler systems above each starter and tail unit probably would quench many fires at their origin.

**"There never will be an automatic control that will adjust itself to all the peculiarities of human nature."**

Transportation of men by belt underground is a relatively safe operation, said E. D. Conaway, engineer, Robinson & Robinson. With belts, there are no runaway man-trips, human failure does not result in wrecks, and normal timbering and patrol of belts can eliminate the possibility of slate falls on a group of men.

The major item of control with respect to belt man-trips is speed, Mr. Conaway said. State and federal authorities consider 225 to 250 fpm a safe speed. Clearance, visibility and the human element are other factors in belt safety. He listed five criteria for safety on belt man-trips, as follows:

1. The speed of belts should be under strict control.
2. Warning signals announcing an unloading point should be well defined.
3. Adequate horizontal clearance should be provided at all entraining and detraining points.
4. Positive control should be provided for all motions actuated by the belt.
5. Loading and unloading stations should be properly lighted.

A careful watch must be maintained in thin seams to guard against reduction of overhead clearance by heaving bottom, Mr. Conaway warned. Since belt man-trips must travel slowly, two-speed control, provided by two-speed motors or by two motors on the same shaft, is essential if transportation of coal is to proceed at satisfactory speed. Special idlers can be installed at loading and unloading points to permit flattening for man-trips and troughing for coal haulage. If a man fails to get off at the unloading station, installation of an electric eye will provide a means of stopping the belt automatically. A turnstile combined with a timing device will ensure that men board the belt at safe intervals. In any event, whatever controls may be installed and whatever rules may be set up, a capable foreman must be in charge of any group of men traveling on a belt. "With all the controls that can be applied to a mechanical device, there never will be an automatic control that will adjust itself to all the peculiarities of human nature," Mr. Conaway concluded.

**"When one can take a firm step toward the promotion of safety and the reduction of costs, the effort is well worth while."**

In a paper on handling man-trips by rail haulage, F. F. Stewart, superintendent, Jewell Ridge Coal Co., laid down four principles looking to safety, as follows:

USE
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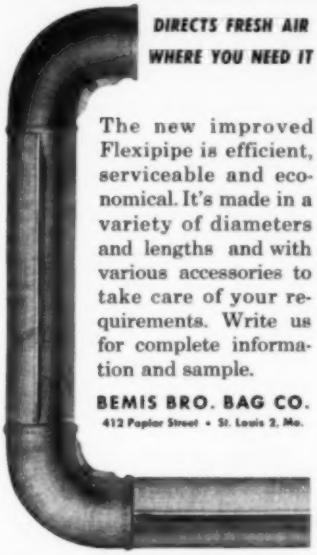
. . . the quality ventilating tubing



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**Platforms:**
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**Capacities:**
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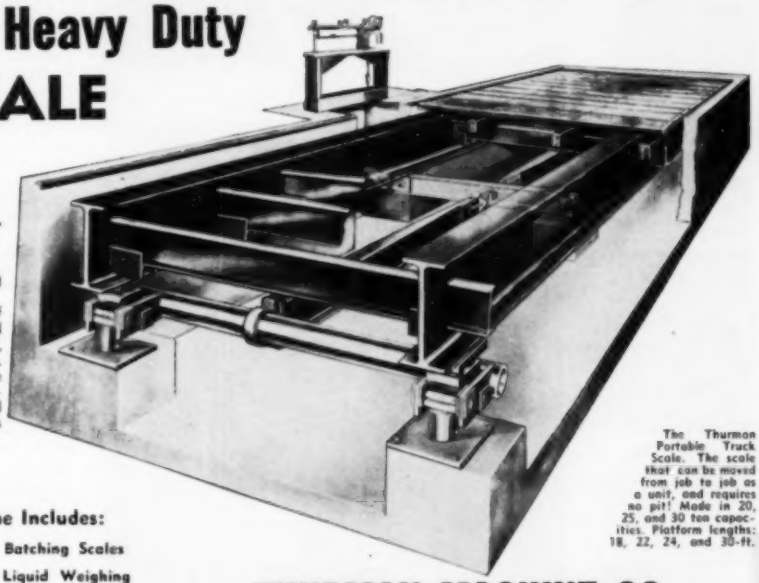
Built to rigid U.S. Bureau of Standards specifications. Pivots and bearings of fine heat-treated steel, electroplated to resist corrosion. Castings and forgings are over-size for safety. I-beams and cross members are extra heavy structural steel. Pit preparation blue prints are furnished.



The Thurman Portable Truck Scale. The scale that can be moved from job to job as a unit, and requires no pit! Made in 20, 25, and 30 ton capacities. Platform lengths: 18, 22, 24, and 30-ft.

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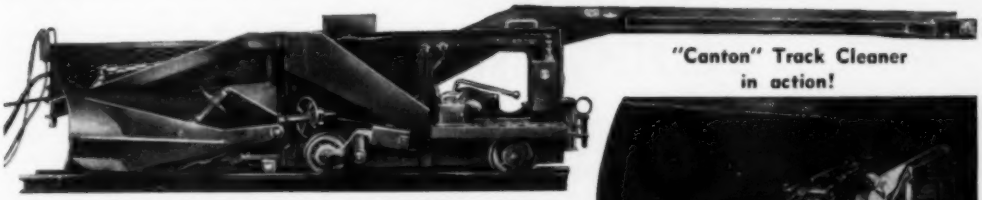

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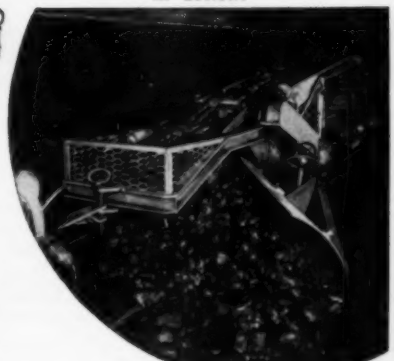

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***Cable Splicers and Vulcanizers***

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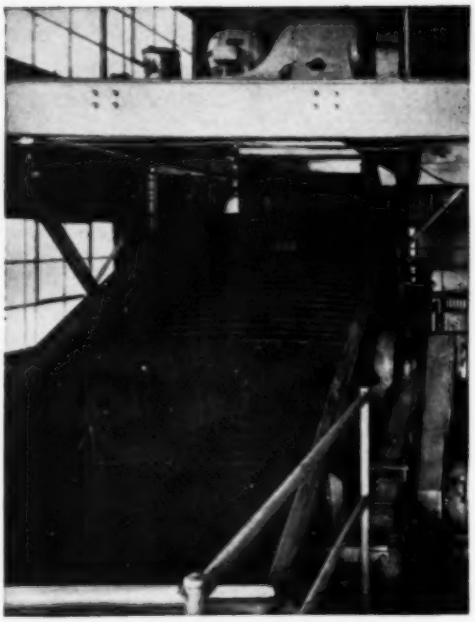

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*Tell us your problem.*
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1. Rules and regulations governing operation and performance of man-trips should be established and enforced.

2. Detailed time studies of man-trip performances should be made to bring to light wasted minutes generally overlooked.

3. Equipment should be provided that will move men safely and economically at a speed within the law.

4. Haulage roads should be built and maintained to haul men and coal economically, safely and quickly.

With special reference to his own operations, Mr. Stewart pointed out that the dispatcher controls all man-trips and that the mine foreman places one supervisor in charge of each man-trip. With portal-to-portal pay in mind, as well as other considerations, the company made careful time studies of man-trip performance. With these studies as a guide, travel schedules were set up and are strictly adhered to. The time studies considered main-line and secondary roads, speeds, unnecessary stops, unloading time, foot-travel time to the working face, and returning time.

Mr. Stewart stressed the advantage of special man-trip cars; namely, they are comfortable and safe; they are insulated from electric wires; the men are restrained from jumping up or out and may brace themselves if a collision occurs; the cars are made for only one purpose and therefore are always available for that purpose; and they release a number of coal-carrying cars that formerly were tied up at the beginning and end of each shift. Best of all, he said, the men get a sense of safety and their morale stays high.

Jewell Ridge now is projecting its transportation plans into the future, Mr. Stewart reported. The main haulage road now is being advanced in 1,000-ft sections at a speed that keeps secondary haulage and walking distance for the men at a minimum. By the time the present main headings reach a distance of 12,500 ft from the portal, a new portal will have been built some 1,800 ft from the face of the main headings. Thus travel time will be held well within the predetermined maximum of 45 min.

### "Here's a new method for instant recognition of a dust hazard that can be used by the average industrial worker."

"Merely by placing a small enclosing hood containing an optical system over his electric cap lamp, a miner can read the dust-concentration comparison scale and tell whether dust control measures are needed or whether those in use are effective," announced R. Emmet Doherty, dust control engineer, The Anthracite Institute. The new method uses either of the two tungsten filaments in the latest model cap lamp, he explained. Component parts of the instrument are a close-fitting sheet-metal cylinder open at one end and slotted, with a double convex lens. At the critical focal point from the lens, airborne dust concentrations are viewed through colored filters

having various light transmission values. When only the yellow filter is lighted, about 5,000,000 dust particles per cubic foot are present; yellow and green filters, about 40,000,000; yellow, green and blue filters, over 50,000,000. The instrument is low-cost and easy to use. It will help acquaint miners with the dust hazard and enlist their cooperation in dust control.

New types of mining equipment should be carefully studied to determine their dust-producing qualities, Mr. Doherty continued. Dust-control features should be built into all machines that can produce dust. In addition, adequate ventilation should be provided in the mine to sweep away and dilute dangerous gases, reduce temperatures and lower humidity. Yet operators should realize that ventilation is no substitute for dust control unless each working place is on a separate split of air. "About 80% of all anthracite producing companies are using dust-control methods. The improvement in atmospheric conditions in anthracite mines over the last 10 yr has been truly amazing," he concluded.

In bituminous mines, the big dust hazard is explosion, said Arthur Bradbury, safety director, Inland Steel Co., who discussed Mr. Doherty's paper. But there are other hazards as well, namely, injury to health and poor visibility, Mr. Bradbury added. The most effective preventive is use of water for all dust-producing operations—drilling, cutting, loading, roof-bolting and preparation. Water infusion of coal pillars prior to drilling and shooting, as practiced at the Kenilworth mine, Independent Coal & Coke Co., Kenilworth, Utah, is gaining favor in the United States (*Coal Age*, August, 1951).

## *Preparing Coal for Markets*

**"For less than half a cent a ton, we can provide electric-resistance heating for wire screen cloth that will prevent blinding."**

Applying electric power of the right voltage and current characteristics to both sides of a screen cloth makes the cloth a resistance heating element that evaporates surface moisture from particles of fine coal and thus releases the particles from the force of water surface tension, said J. E. Dunn, Processing Machinery Dept., Allis-Chalmers Mfg. Co., and M. W. Summers, vice president, Westmoreland Coal Co., who prepared a joint paper on this subject. Mr. Dunn read the paper at the preparation session Wednesday afternoon, J. B. Morrow, consulting engineer, Alford, Morrow & Associates, presiding.

Several manufacturers have developed or are developing resistance-heating units adapted to their screens, Mr. Dunn reported. The heating unit usually consists of one or more transformers of the variable-voltage type, ranging in size from 5 to 30 kva, primary voltage 220 or 440 v, secondary voltage, 2 to 10 v, depending upon the area of the screen, specification of the screen cloth and whether carbon or stainless steel is used. Careful insulation of the screen cloth is essential.

Factors to be considered in installing heaters for screen cloth are tons per hour of feed, screen analysis of the feed, surface moisture and temperature of the feed. Generally, if the cloth is heated to 160 to 180 F, blinding will be eliminated even when handling high-moisture coal, he said.

With special reference to the Westmoreland preparation plant, which has a capacity of 420 tph of 8x0 coal, including a feed of about 250 to 300 tph of 1½x0 coal to four Ripl-Flo screens, Mr. Dunn said that 4½ v secondary current now—in late spring—is used to heat the cloth to about 100 F, which is sufficient to prevent blinding. In the winter, the transformer is operated at about 7½ v. Operating cost runs at 0.455c per ton. Installation costs may run from $1,500 to $4,000. Units can be installed in existing screens by any qualified mechanic and electrician, he pointed out. At Westmoreland, where stainless-steel cloth is used, there have been no maintenance requirements.

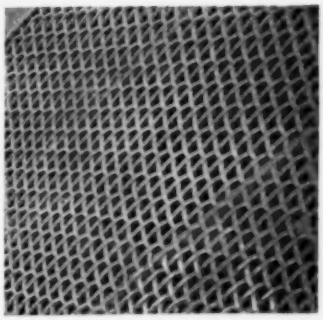
To operate resistance-heated screens efficiently, Mr. Dunn warned that the following guides should be followed:

1. Feed must be controlled (Westmoreland uses a rotary feeder and a surge hopper ahead of the screen).
2. With four screens in parallel, as in the Westmoreland plant, the first three screens should receive 90% of the load, leaving the fourth to take care of the remaining 10% plus surge loads.
3. Screens must not be overloaded. Depth of the bed should not exceed particle thickness.
4. Excessive heating, above 200 F, will hinder rather than help the operation.
5. Transformers should be located as close as possible to the screen.
6. Flexible cables from transformer to screen should be as short as possible.
7. Resistance heating is most effective for openings ½ in and smaller.

**"New equipment and modifications and improvements to existing equipment are simplifying the recovery, handling, cleaning and dewatering of fine coal."**

Several factors are directing increased attention to fine-coal recovery, said James P. Blair, coal preparation engineer, Heyl & Patterson, Inc. These factors are: (1) increased production of fine coal by mechanized mining, (2) the desire to stretch dwindling coal resources and (3) the need for disposing of plant effluents. Noting that anthracite and bituminous each presents its own problem, he described methods of treat-


HEWITT



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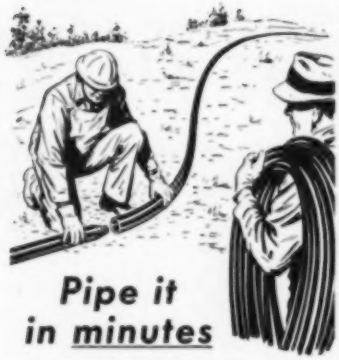

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ing sludge at mines of Lehigh Navigation Coal Co. and Philadelphia & Reading Coal & Iron Co. in the anthracite field; and at mines of The United Electric Coal Cos. and DeBardeleben Coal Corp. in the bituminous fields.

The Tamaqua breaker of Lehigh Navigation Coal Co., using froth flotation to reduce ash from 30 to 12%, is recovering 100,000 tons per year of marketable coal, minus 35-mesh, from a nearby silt bank and coarse breaker effluent. The company began operating a similar circuit at the Coaldale breaker early this year. The Locust Summit breaker of P. & R. uses Lasseter-type froth-flotation cells to recover minus 3/32-in coal from a slush dam and coarse-coal breaker effluent. The Lasseter cells, which effect a "matte"-type flotation, are especially adaptable to the somewhat coarser fines handled in this operation.

The fine-coal plant at the Fidelity mine, The United Electric Coal Cos., treats slurry recovered by a dredge from a nearby sludge pond (*Coal Age*, November, 1951). Eventually, the plant using Denver Sub-A froth-flotation cells and filters, will treat effluent coming directly from the coarse-coal preparation plant. Since flotation characteristics of fresh slurry differ considerably from those of slurry from the pond, some adjustments will have to be made in the froth treatment when the fine-coal plant is on "fresh" slurry feed.

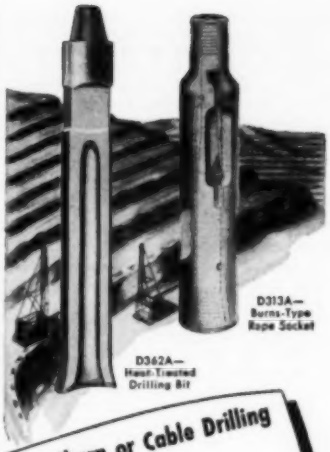
At the Empire plant, DeBardeleben Coal Corp., minus 28-mesh materials from dewatering screens and settling tanks are pumped to four cyclone thickeners. The cyclone feed, with ash concentrated in the minus 80-mesh sizes, is about 14% ash. Underflow from the thickeners runs about 8% ash; overflow, which goes to refuse, averages about 15.3% ash.

Speaking generally of other developments in slurry treatment, Mr. Blair drew attention to increasing use of centrifuges and stressed the recent development of horizontal bowl-type centrifuges for more complete recovery of usable coal.

Discussing Mr. Blair's paper, S. N. Parmley, consulting engineer, urged that attention be given to the following factors when froth-flotation plants are installed:

1. Economics of treating the slurry by froth flotation.
2. The type of flotation unit best suited to coal characteristics and market demand.
3. Provision for enough cleaning units to avoid overloading.
4. Density of the feed.
5. Conditioning time.
6. Flexibility of the cells for retreatment.
7. Breaking of the froth to obtain maximum filter capacity.
8. Type of filter units.
9. Disposal of tailings.
10. Kind and quality of reagents and their application.

John Griffen, McNally Pittsburg Mfg. Corp., further discussing Mr. Blair's paper, noted the extensive use of metal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filter cloth in European coal-preparation plants and remarked that its use is catching on in the United States.

**"The Tromp heavy-density bath gives performance beyond the capacity of early preparation facilities."**

Describing the first installation of a McNally-Tromp heavy-density cleaning system in the United States, J. W. MacDonald, chief engineer, Old Ben Coal Corp., told how it works at the company's Mine No. 22, Valier, Ill. The plant is designed with five of the bath units for preparing 6x2- and 2x5/16-in sizes, the 5/16x0 being cleaned in Rheolaveurs. Raw feed ranges from 800 to 850 tph. Primary separation is made with two coarse-coal and two small-coal bath units. Secondary separation of the primary sink material is made in a single bath unit. Primary separation of the coarse coal is made at 1.36 specific gravity; of the small coal, 1.43 specific gravity. The 6x1-in assembled sink material from the large- and small-coal baths goes to a single bath for recovery of a middlings product, which is separated at 1.60 specific gravity. The recovered middlings are crushed to 1¼x0 and recirculated to be mixed with the raw coal.

Performance of the coarse- and small-coal circuits indicates considerable improvement over conventional hydro separation, Mr. MacDonald said. Operation in the second week in April, 1952, showed 3.72% average sink material in the cleaned coarse coal when the primary sinks contained 0.58% of float. Total misplacement thus amounted to 3.08% of the raw feed. In the small-coal units, operations in March showed misplacement of 3.19%, when the clean-coal sink material averaged 2.04%. Performance data for separation in the middlings bath are not yet available but indications are that operation will be satisfactory.

Heavy density of the separating media is provided by fine magnetite, Mr. MacDonald explained. Magnetite is recovered from the rinse water by hydraulic classification. Magnetite loss now runs about 0.81 lb per ton of raw coal delivered to the bath units. Automatic regulators, consisting essentially of a hydrometer element within a tube or well, are installed to govern density control within each of the five baths. The hydrometer is suspended from the end of a scale beam carrying a sliding weight on the opposite end for adjustment. The weight-carrying end of the control beam terminates in a pole operating within two parallel coils. Measured impedance activates a Modutrol motor for movement of a splitter gate, which governs the disposition of overflow from each bath regulator cone.

Republic Steel Corp. is installing a McNally-Tromp plant that probably will be operating by January, 1953, said Orville Lyons, preparation engineer for that company, who commented on Mr. MacDonald's paper. The aim at Republic is to reduce the ash in washed coal from the Mary Lee seam in Alabama.


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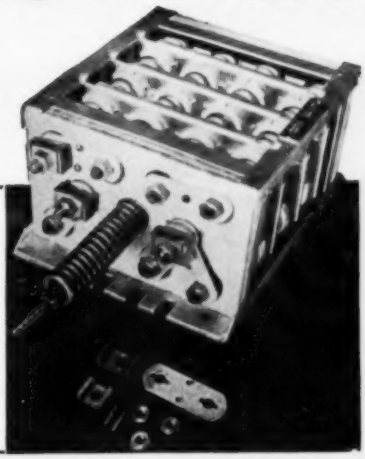

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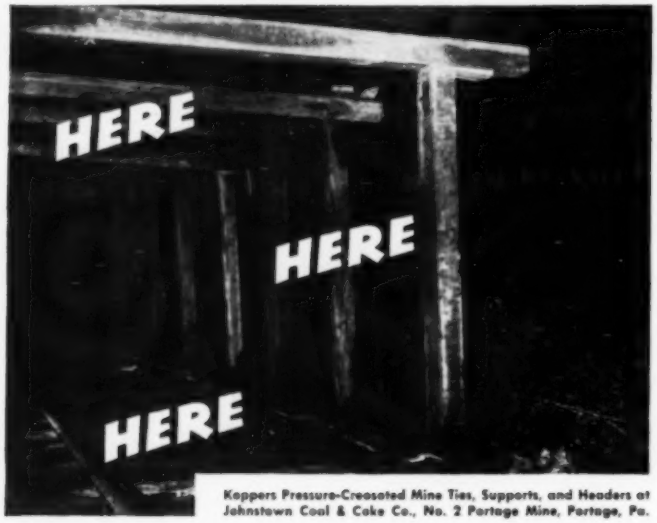


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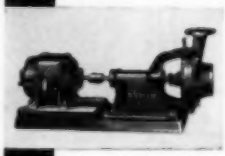

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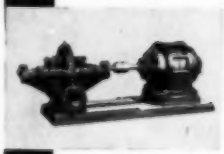

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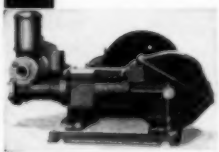

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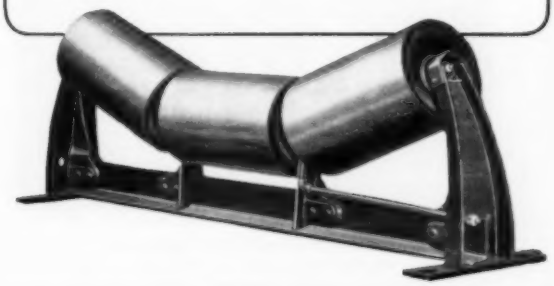

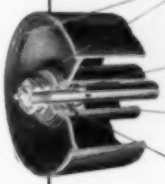
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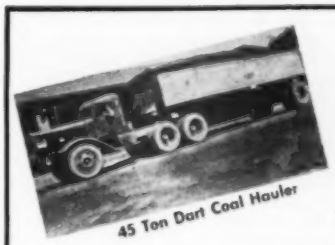

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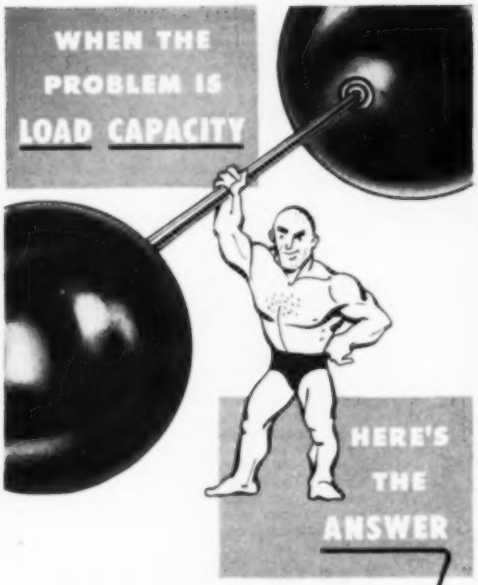


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SHAFER
SELF-ALIGNING
ROLLER BEARINGS
INDUSTRIAL • AIRCRAFT

- Self-aligning, free rolling action
- Radial-thrust load capacity.
- High reserve shock capacity.
- Self-Centering "Z" housing seal.
- Micro-Lock 12-point adjustment.
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- Sizes and mountings for all applications.
- Representatives in all industrial centers.
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In planning new business ventures—along unplotted courses—you need an experienced guide who can offer the best professional advice obtainable.

Allen & Garcia Company, a professional mine engineering service, has the experience to warrant confidence and trust in expert analysis of your problems . . . experience based on a reputation of sound, scientifically correct recommendations.

Unencumbered by affiliation with *any* manufactured product, you are assured of unprejudiced approaches to all of your problems. A & G specially-trained engineers are qualified to accurately evaluate and efficiently remedy problems for small mines as well as the largest. Preliminary consultation is yours without obligation.

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- General consulting work regarding power, equipment, operation and various mining problems.
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- ✔ A FLEXCO fastener that is HINGED. Has removable hinge pin.
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**Burns Any Type of Fuel**

The "Sutton" Sand Dryer may be fired with any type of fuel. While most "Sutton" Sand Dryers are equipped to burn coal, they can be furnished with burners for natural gas or fuel oil.

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- Simple in operation
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**Send for this new booklet —it tells how you can help out in the emergency facing the nation.**

Many thousands of manufacturing plants now face serious shortages of steel and products made of steel.

Unless the steel mills and foundries get more *scrap* iron and steel, it will be impossible to meet current demands for both military and civilian production.

*You* have the needed scrap—in the form of "idle" iron and steel: obsolete machinery, no-longer-usable jigs and fixtures, chain, gears, pulleys, pipe, etc.

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*For copy of "how-to-do-it" booklet, address Advertising Council, 25 W. 45 St., New York 19, N. Y.

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FACTORY PACKAGED
PIPE—COUPLINGS
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*Immediate Installation* by one unskilled man. 2½ to 12½ o. d. black or galvanized. Larger sizes can be furnished. Ready to lay—without delay.

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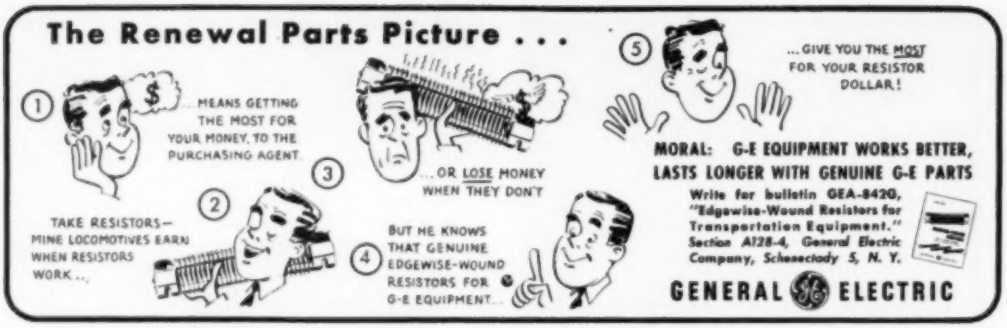
1
$
. . . MEANS GETTING THE MOST FOR YOUR MONEY, TO THE PURCHASING AGENT.
2
TAKE RESISTORS— MINE LOCOMOTIVES EARN WHEN RESISTORS WORK . . .
3
. . . OR LOSE MONEY WHEN THEY DON'T
4
BUT HE KNOWS THAT GENUINE EDGEWISE-WOUND RESISTORS FOR G-E EQUIPMENT . . .
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. . . GIVE YOU THE MOST FOR YOUR RESISTOR DOLLAR!

**MORAL: G-E EQUIPMENT WORKS BETTER, LASTS LONGER WITH GENUINE G-E PARTS**

Write for bulletin GEA-8420, "Edgewise-Wound Resistors for Transportation Equipment." Section A128-4, General Electric Company, Schenectady 5, N. Y.

GENERAL ELECTRIC

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**FOR BETTER DUST CONTROL**

Write for Details

**VIKING MACHINERY SALES CORP.**

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—anywhere

"We look into the Earth"

**PENNSYLVANIA Drilling CO.**

DRILLING CONTRACTORS AND MFRS.

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## "LUBRIPLATE No. 630-AA is Practically a Universal Lubricant"

The Spokane Portland Cement Company of Irvin, Washington writes, "With the introduction of LUBRIPLATE No. 630-AA we reduced the number of lubricants we were using from ten to two. LUBRIPLATE No. 630-AA might almost be considered a *UNIVERSAL LUBRICANT*".

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3. **LUBRIPLATE is economical to use**

Write today for case histories of savings made through the use of LUBRIPLATE in your industry.

**LUBRIPLATE DIVISION**
Fiske Brothers Refining Co.
Newark 5, N. J. Toledo 5, Ohio

*The Different LUBRICANT!*

DEALERS EVERYWHERE, consult your Classified Telephone Book

# LAY THAT DUST!

*Dustproof coal with*

# WYANDOTTE CALCIUM CHLORIDE

Wyandotte

*Wyandotte Chemicals Corporation, Wyandotte, Michigan*

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*NEW ADVERTISEMENTS: Address N.Y. office, 330 W. 42 St., N.Y. 36, for July issue. Closing June 18th*

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**WANTED**

# COAL SALES MANAGER

Coal Mining organization seeks a sales executive who is capable of disposing of substantial tonnages of bituminous coal to large consumers. Connections with utility companies desirable. Submit qualifications and compensation required.

**SW 4356 COAL AGE**
**330 W. 42nd St., New York 36, N.Y.**

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## WANTED — ENGINEER

**ENERGETIC, IMAGINATIVE, SUPERVISORY EXPERIENCE,**

To lead section on development of coal preparation and washery water clarification apparatus. Position permanent for the right man. Box P 3704 Coal Age, 330 W. 42nd St., New York 36, N. Y.

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**OPPORTUNITY FOR CHIEF ELECTRICIAN**

Old established metal mining company in Northern California needs experienced chief electrician for underground and surface plant. Family dwellings, good schools including nearby high school and junior college. Excellent climate. 2,600 foot elevation. Write giving details of experience, age, salary expected:

P 4401 Coal Age
68 Post St., San Francisco 4, Calif.

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*REPLIES (Box No.):*
*Address to office nearest you*
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*CHICAGO: 520 N. Michigan Ave. (11)*
*SAN FRANCISCO: 68 Post St. (4)*

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WANTED—EXPERIENCED Mine Draftsman. Apply to Inland Steel Company Wheelwright, Kentucky.

WANTED—MINE Electrical-Mechanical Foreman for one year contract for mine construction work Greece. Submit education, experience, references, favorable contract terms for overseas work. P-4195, Coal Age.

### Business Opportunity

FOR SALE—ONE HUNDRED ACRES Ohio stripping coal, six foot vein, low overburden. BO-4391, Coal Age.

### WANTED

ANYTHING within reason that is wanted in the field served by Coal Age can be quickly located through bringing it to the attention of thousands of men whose interest is assured because this is the business paper they read.

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**No lengths too long or too short**
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**PIERCE CABLE CO.**
**2664 Clybourn Ave. Chicago 14, Illinois**

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### LOCOMOTIVES, 250 VOLT DC, BALLBEARING

2—20-ton Jeffrey MH-77
2—15-ton West. 900-C
2—15-ton Goodman 35-A
5—15-ton Jeffrey MH-110
4—13-ton G.E. HM-827
2—13-ton Jeffrey MH-110
1—10-ton Jeffrey MH-110
4—10-ton Goodman 34-B
12—8-ton Jeffrey MH-100 with rools
3—8-ton G.E. MH-819 with rools
4—8-ton West. 805-C with rools
4—8-ton G.E. HM-834 with rools
15—6-ton Jeffrey MH-88 with rools

Complete with new Jeffrey steel strip resistances. All have been rebuilt and any part showing any wear was replaced with new.

Sheldon J. Wolfe Frank J. Wolfe

### LOADING MACHINES, 250 VOLT DC

6—14-BU-3PE Joy
4—14-BU-7RBE Joy
6—11-BU Joy
6— 9-BU Joy
10— 7-BU Joy
5—460 Goodman
2—360 Goodman
4—260 Goodman
5—L-600 Jeffrey
2—L-500 Jeffrey
2—Meyers-Whaley No. 5 Automats, practically new.

### PERMISSIBLE TYPE, 250 VOLT DC

4—Jeffrey 29-U
3—Jeffrey 29-LE
10—Jeffrey 35-BB
4—Jeffrey 35-BC
6—Jeffrey 35-BSC
3—Sullivan 11-B
6—Sullivan 7-B on Joy cuts
6—Goodman 512 on Joy cuts

### AC CUTTING MACHINES—220/440 VOLT

2—Jeffrey 29-U
1—Jeffrey 24-B
3—Jeffrey 35-BB
1—Jeffrey 35-L
5—Goodman 12G3
5—Goodman 112G3
4—Goodman 112G3A
2—Goodman 112DG3A

### ROTARY CONVERTERS—TYPE HCC-6, 275 V, 1200 RPM, 2300/4000 V

1—300 KW G.E.
6—200 KW G.E.
1—100 KW G.E.
3—250 KW West. Mine Type Rectifiers

### STEEL MINE CARS

Several lots of Rotary Dump, End Dump, and Drop Bottom Mine Cars for high and low vein mines. Mail us your inquiries. We have them in lots from 100 to 600, track gauges 36" — 40" — 42" — 44".

### STEEL TIPPLES AND WASHERS

Several 4-, 5-, and 6-track late type steel Tipples; also Link Belt, McNally-Norton and Heavy Media Coal Washers with capacities of 200 and 300 tons per hour; and two McNally-Norton Unit Washers of 100 tons per hour capacity.

### CABLE REEL SHUTTLE CARS, 250 VOLT DC, ALL TYPES

### M. G. SETS, 275 V, 1200 RPM, 2300/4000 V

1—300 KW West., full automatic switchgear
1—300 KW G.E., full automatic switchgear
4—200 KW G.E., full automatic switchgear
3—150 KW G.E., manual switchgear

### ELECTRIC HOISTS

We have all types of Hoists from 100 HP to 1500 HP, suitable for shops, slopes or drift mines. Complete specifications on request.

**WE SPECIALIZE IN BUYING OUTRIGHT COMPLETE MINES THAT ARE GOING OUT OF BUSINESS OR FROM RECEIVERS IN BANKRUPTCY, ADMINISTRATORS OF ESTATES, ETC.**

## COAL MINE EQUIPMENT SALES COMPANY

**FRANK J. WOLFE** — **SHELDON J. WOLFE**
**306-307 BEASLEY BUILDING • LONG DISTANCE PHONE 34 • TERRE HAUTE, INDIANA**

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### MOTOR GENERATORS

1—400 KW G.E. Syn. 575 V. 720 RPM
1—300 KW G.E. Syn. 275 V. 1200 RPM
2—300 KW WEST. Syn. 275 V. 1200 RPM
1—300 KW RIDGWAY Syn. 275 V. 1200 RPM
1—200 KW G.E. Syn. 275 V. 1200 RPM
1—200 KW RIDGWAY Syn. 275 V. 900 RPM
1—150 KW WEST. Syn. 275 V. 1200 RPM
1—100 KW RIDGWAY Syn. 275 V. 1200 RPM
1— 50 KW G.E. Ind. 275 V. 1200 RPM

### ROTARY CONVERTERS

1—500 KW WEST. Syn. 275 V. 1200 RPM
2—300 KW AL-CH Syn. 275 V. 1200 RPM
1—200 KW G.E. Syn. 275 V. 1200 RPM
1—150 KW G.E. Syn. 275 V. 1200 RPM
1—150 KW West. Syn. 275 V. 1200 RPM

### PORTABLE COMPRESSOR

1—Ingersoll-Rand, Model 25-B, Two Stage Air Cooled. Size 8 x 5 x 9" Stroke 100# Pressure. Driven by 30 HP Westinghouse 250 V. DC Motor with Automatic Starter. Mounted on 36" Gauge Trucks.

### LOCOMOTIVES

2—30 T JEFFREY 250 V. 3-MH-77, 48-36" Ga.
1—25 T G.E. 500/250 V. 3-HM-824-A, 44-36" Ga.
1—20 T JEFFREY 250 V. MH-77, 48-36" Ga.
1—20 T G.E. 250 V. (Tandem) HM-809, 36" Ga.
1—15 T JEFFREY 250 V. MH-110, 48-36" Ga.
1—13 T JEFFREY 500 V. MH-110, 48-36" Ga.
1—10 T JEFFREY 250 V. MH-2110, 48-36" Ga.
2—10 T JEFFREY 250 V. MH-110, 42-36" Ga.
1—10 T WEST. 250 V. ML-907-C 36" Ga.
2—10 T GOODMAN 250 V. 34-B, 36" Ga.
2— 8 T JEFFREY 250 V. MH-100, 42-36" Ga.
2— 8 T WEST. 250 V. ML-906-C, 44-36" Ga.
2— 8 T JEFFREY 250 V. MH-88, 44-36" Ga.
2— 6 T JEFFREY 500 V. MH-88, 44-36" Ga.
2— 4 T GOODMAN 250 V. MS-4-E, 36-24" Ga.

### LOCOMOTIVE MOTORS

2—JEFFREY 250 V. MH-77, Ball Bearing
2—WEST. 250 V. ML-908-C, Ball Bearing
2—WEST. 250 V. ML-906-C, Ball Bearing
2—WEST. 250 V. ML-906-R, Ball Bearing
2—G.E. 500/250 V. HM-824-A, Ball Bearing
4—WEST. 80 V. V-49-X, Ball Bearing
Extra Armatures Available for Above Motors

## WALLACE E. KIRK COMPANY

**501 GRANT BUILDING — PITTSBURGH 19, PENNSYLVANIA**
***A Quarter of a Century Serving Mining and Industrial Companies***

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**FOR SALE**
**New 500 Gal. Skid Mounted STORAGE TANKS**
**Shell of ¼" Steel, 2" Outlet and 12" Manhole in Top.**
**LEFTON INDUSTRIAL CORP.**
**212 Victor Street, St. Louis (4) Mo.**

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**NEW CONVEYOR IDLERS 300—60 IN.**
2400 — 36 in. 1000-42 in. Troughing
600 — 36 in. 483-42 in. Return
**NEW CONVEYOR TERMINALS**
35 Complete Sets for 36 in. and 42 in. with gear drives, lagged head pulleys
**NEW VIBRATING SCREENS**
10 Allis-Chalmers 6 x 14 2 deck
**STANHOPE 60 E. 42nd St., New York 17, N.Y.**

# DIESEL GENERATOR SETS

(D.C. SETS)

30—100 K.W. SUPERIOR GBD-8, 250 volts—ENGINE: Superior GBD-8, 5½ x 7, 8 cylinder, 150 H.P., driving 100 K.W. Delco generator—120/240 volts D.C., 417 amps., electric starting—with switchboard for generator.

(A.C. SETS)

2—100 K.W. G.M. 3-268A—ENGINE: 150 H.P. driving 440 volt, 3 phase, 60 cycle A.C. generator. Can be re-connected for 220 volts A.C. Has generator switchboard and engine operating panel.

2—200 K.W. G.M. 8-268A—ENGINE: 8 cylinders, driving 200 K.W. 440 volt, 3 phase, 60 cycle A.C. generator. Can be re-connected for 220 volts A.C. Has generator switchboard.

1—30 K.W. G.M. 3-71—ENGINE: 3 cylinder, electric starting, radiator cooled, driving 30 K.W.—37½ K.V.A. 440/220 3 phase, 60 cycle generator. Complete with switchboard and engine operating panel.

**100 KW DIESEL GENERATOR SET**

**Slow Speed — Heavy Duty**

Manufactured by LORIMER. 5 cylinder — 4 cycle — 720 RPM — 400 Volts A.C., 3 Phase, 60 cycle. Heat Exchanger Cooled — complete with Switch Gear. Can be reconverted for 220 Volts.

Also check us for Steel Gin Poles.

ALL MATERIAL REMQVED FROM LATE TYPE SHIPS.

**WRITE—WIRE—PHONE**

## THE BOSTON METALS CO.

**313 E. Baltimore St.** CU 5050 **Baltimore 2, Md.**

## FOR SALE
## GUARANTEED A-1 RECONDITIONED COAL MINING EQUIPMENT

Goodman 360 Loaders
Goodman G20B77 Shaker Conveyors
Sullivan 7AU Cutting Machines
Sullivan 7B Cutting Machines
CPT574 Post Mounted Drills
Joy 7BU Loaders

New spare parts for all of the above equipment at substantial savings.

**KAISER STEEL CORPORATION**
**SUNNYSIDE, UTAH**

## LOOK
**Stock Reducing Sale**
## ROTARY CONVERTER SETS

For this month, a discount on any converter in our stock.
Sets complete with accessories.
Any size for any voltage can usually be furnished
Do not pass up this opportunity to purchase high class equipment at very attractive prices—write, wire or 'phone.

**R. H. BENNEY EQUIPMENT CO.**
5024 Montgomery Road
Cincinnati 12, Ohio

**MOTOR GENERATOR SETS**

1—300 KW Ridgway Sync., 2300 V — 275 V DC.
2—200 KW West. Sync., 2300 V — 275 V DC.
2—200 KW Ridgway Sync., 2300 V — 275 V DC.
1—150 KW West. Rotary Converter, 2300 V — 275 V DC.
1—100 KW G. E. Sync., 2300 V — 275 V DC.
1—50 KW G. E. Sync., 2300 V — 275 V DC.

**CUTTING MACHINES**

2—29U Jeffrey, 250 V. Track Mounted.
2—29LE Jeffrey, 250 V. Track Mounted. BARGAIN.
2—35BB Jeffrey, 250 V. Shorbwalls.

**CRUSHERS**

1—36 x 48 Link-Belt Double Roll.
1—24 x 72 McLanahan Single Roll, Remov. Segments.
1—30 x 24 Jeffrey Hammermill.
1—18 x 18 Jeffrey Single Roll.

**TIPPINS MACHINERY CO.**
Pittsburgh 6, Penna.

**MOTOR GENERATOR SETS**

750 KW Al.Ch. 250 v. 720R-Syn. 2200/440 v.
400 KW West., 550 v. 720R-Syn.-SK 2300/4000 v.
2—300 KW West., 275 v. 1200R-Syn. 2300 v.
300 KW G.E. 275 v. 1200R-MPC-ATI 2300/4000 v.
300 KW Ridg. 275 v. 1200R-Syn. 2300 v.
300 KW West. 550 v. 1200R-Syn.-SK 2300 v.
200 KW West. 275 v. 1200R-SK-CW 2300 v.
200 KW G.E. 275 v. 1200R-MPC-ATI 2300/4000 v.
200 KW Ridg. 275 v. 900R-Syn. 2300 v.
200 KW West. 275 v. 900 R. SK-Syn. 2300 v.
200 KW G.E. 125 v. 1200 R MPC-ATI 2300/4000 v.
150 KW G.E. 275 v. 1200 R. MPC-ATI 2300/4000 v.
150 KW West. 275 v. 1200R-Syn.-SK 2300 v.
150 KW G.E. 550 v. 900R-DLC-ATI 2300/4000 v.
100 KW Ridg. 275 v. 1200R-Syn. 2300 v.
100 KW Burke 250 v. 900 R-Syn. 220 v.
50 KW G.E., 125/250 v. 1200R-MT-RC 220/440 v.
35 KW G.E. 125 v. 1750 R. RC-KT 220/440 v.
15 KW Ideal 125 v. 1750R. D.A 220/440 v.
10 KW Bardco 125 v 1750R. 220/440 v.

**ROTARY CONVERTERS**

500 KW West. 275 v. 1200 R. 2200/4000
400 KW West. 250/125 v. 1200R. (3,360/2200, 4000 v.
2—300 KW Al.Ch. 275 v. 1200R. 2200/4000
300 KW G.E. 275 V. HC12-600 R. 2200/4000
200 KW G.E. 275 v. HCC6-1200R. 2200/4000 v.
150 KW G.E. 275 v. HCC6-1200R. 2200/4000 v.
150 KW West. 275 v. 1200R. 2200/4000 v.

**LOCOMOTIVES AND CUTTING MACHINES**

20 Ton Jeff 250 v. 44" Ga. MH77
13 Ton Jeff 250 v. 36/48" Ga. MH110
10 Ton Jeff 250 v. 36/48" MH110
8 Ton Goodman 250/550 v. 42"/44" ga.
6 Ton Westgh. 250 v. 36" Ga. 904
2—6 Ton G.E. 250 v. 28½" ga.
5 Ton Greensburg Bat. Loco.—Philco Bat.
4—5 Ton Goodman 30B 250 v. 42/44"
35 B Jeff. 250 v. Permissible
12 G3 Goodman Shortwall 220/3/60
35 BB Jeff. A.C. permissible
3—12A Goodman Shortwall 50HP Motor 230 v.

**AC MOTORS**

| HP | MAKE | SPEED | TYPE | WDG. |
|---|---|---|---|---|
| 400 | G.E. | 450 | MT | S.R. |
| 300 | G.E. | 450 | IM | S.R. |
| 150 | G.E. | 900 | ATI | Syn. |
| 2—100 | G.E. | 450 | IM | S.R. |
| 100 | West. | 900 | | Syn. |
| 100 | West. | 1200 | CS | S.C. |
| 75 | West. | 900 | CS | S.C. |
| 50 | G.E. | 1750 | KT | S.C. |
| 50 | Al. Ch. | 1200 | AR | S.C. |
| 50 | G.E. | 900 | KT | S.C. |
| 40 | G.E. | 900 | MT | S.R. |
| 10 | G.E. | 900 | KT | S.C. |
| 30 | G.E. | 1200 | KT | S.C. |
| 20 | West. | 1200 | CS | S.C. |

## MOORHEAD ELECTRICAL MACHINERY CO.

363 Noblestown Road
Oakdale, Pa.
(Est. 1919)

*Pittsburgh District*
Pittsburgh Tel. WAlnut 1-4300

## *FOR SALE*
## WIRE ROPE

2—1,250 Ft. Pcs. 1-5/16" Roebling Locked Smooth Coil Track Strand Wire Rope for Aerial Tramway. NEW—NEVER USED. Apply to THE SNAP CREEK COAL COMPANY, P.O. Box No. 1029, or Tel. 1533, Logan, West Virginia.

MOTORS, GENERATORS, TRANSFORMERS
1 — 1500 H.P.
Bought and Sold
New and Rebuilt
ELECTRIC EQUIPMENT CO.
ROCHESTER 1, N. Y.

## SACRIFICE SALE

1—75 KW 250 V. D.C. General Motors Diesel Generator Set, complete with panel. Set is 6SI Series Diesel with Imperial Generator. This set is 7 months old and will fully guarantee.

Owner: Anthony Olivio
1304 Stanton Ave., New Kensington, Pa.
Telephone: New Kensington 3312-R

**LOCOMOTIVES**

5—13 ton Jeffrey MH-110, 250 DC, 42" Ga.
1—20 ton Jeffrey MH-110, 250 DC, 42" Ga.
3—6 ton Jeffrey MH-100 250 DC 42" ga.
6—6 ton Jeffrey MH-88
6—6 ton Mancha Battery Type 48 coil. C-61-6 mtrs. 42" ga.
5—13 ton G.E. 42" ga.
20—6 ton Goodman, 42" ga.
3—6 ton Goodman, 42" ga.
3—15 ton Westinghouse, 42" ga.
8—5 ton GE Battery, 36" ga. (with batteries)
3—5 ton Mancha Battery, 36" (with batteries)
2—12 ton Jeffrey, 42" ga.
2—12 ton G.E. 42"
6—5 ton GE Battery, 42"
2—12 ton Goodman, 42" ga.

**LOADING MACHINES**

25—Joy Loaders, 250 DC, 42" ga. 7 & 5 BU
2—Joy Continuous Miners, 250 DC

**CUTTING MACHINES**

10—Goodman Shortwall Cutting Machines

**COAL DRILLS**

17—Chgs-Prou. post mtd'd coal drills, AC & DC
50—Type 473 Dooley Bros. Elec. Coal Drills

**MINE & SHUTTLE CARS**

150—4 ton steel mine cars, 42" ga. 'E dump
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200—2½ ton ditto
10—Charging panels for shuttle car batteries

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1—300 KW GE
1—75 Westinghouse MG set

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1—36" SA Conveyor with 150 HP drive, 2000'
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1—6 ton heavy duty L.B. car shakeout with ½ ton elec. hoist for 220/440
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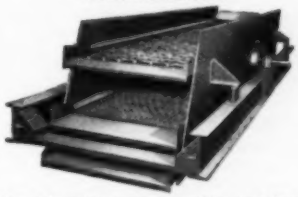

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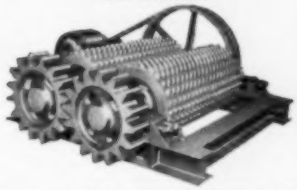

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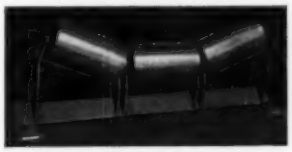

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CE&7 Sullivan 7-½ ft. Bar Type—TI-3E & TI-1E 30 H.P. 250 V.D.C. trackmounted on Joy Caterpillar

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Lee-Norse Koalmobiles (Shuttle Cars) equipped with elevating conveyors to load coal into mine cars. Type K.M.C. 46A-46A4-46B-2

### ELECTRIC TROLLEY LOCOMOTIVES

Out side armor plate frames
Jeffrey Main Line Trolley Locs. 15 ton Blt. 1944 with air brakes
G.E. Main Line Trolley Locs. 15 ton
Jeffrey Main Line Trolley Locs. 15 ton
G.E. Main Line Trolley Locs. 10 ton
Jeffrey Main Line Trolley Locs. 10 Ton built 1945

### STORAGE BATTERY LOCOMOTIVES

G.E. Type LxB Class 2T5-D.B. Pull 2000#
Form L—48 cell battery 5.5 M.P.H.
Mancha-Type 42 Standard 48 cell battery

### ROCK DUSTERS

2—M.S.A. HI Pressure Heavy Duty track mounted Rock Duster (20 H.P. motor)

### STEEL TIPPLES

Several —, 3, and 4 Track late type all steel Tipples with all appurtenances complete

### COAL WASHING PLANT

COMPLETE, PRACTICALLY NEW McNally-Norton of Pittsburgh CAP. 75 Ton per hr.
COMPLETE, PRACTICALLY NEW Link Belt—CAP 200 ton per hr. — circular type completely rebuilt in 1949

### RECTIFIER

(complete with all auxiliaries)
Westinghouse Ignitron Rectifier—continuous Rating 300 K.W. 275V—D.C.—Amps—1000 D.C. (New in 1944)

### M. G. SETS type S.K.

Westinghouse Synchronous Motor 400 H.P.-D.C. Gen.—300 K.W.
Westinghouse Synchronous Motor—220 H.P. 60 Cys. 3 Ph. 1200 R.P.M. Output 2300 V.
Westinghouse—150 K.W. 275V-543A-1200 R.P.M. with switchboard-relay and oil circuit breakers and panel boards complete

### TRANSFORMERS

5 KVA to 667 KVA

### ELECTRIC CAR PULLERS

Western Electric Induction Motor 52 H.P. 600 R.P.M. 440V. 76 Amp—3PH—60 cys. Type — 3—4 ft by 4 ft drums; 2600 ft. 1-¼" steel rope —4 ft. sheaves

### ROTARY CONVERTER

Westinghouse Synchronous Converter 200 K. W. 230 V. D.C. 800 AMP D.C. 1200 R.P.M.—60 cycle—6 phase complete with controls and all accessories.

### HOISTING ENGINE

New 1850 Litchfield—24" x 36" — 7' — 9' Step Up Drums
2—1⅝" ropes 715' long

### COMPLETE POWER PLANT

4—600 H.P. Water tube boilers. Now operating. Foster Superheaters and Riley Spreader Type Stokers complete

### TURBINE GENERATORS

American Brown Boveri 3 PH. 2300V. 5180-KVA output speed 3600 cont. to 175 H.P. G.E. Synchronous Motor—3 ph. 60 cyc. 2300V.
Allis-Chalmers Turbine 3 Ph.—6600V. 3125 KVA —2500 K.W.—V 2300
Allis-Chalmers—Turbo Generators, 1875 KVA, 3 Ph. 60 Cys. 2400V. 3600 R.P.M.
Complete tipple and reserveser, capacity 300 tons per hour
One electric car puller
One new hoist engine complete with 1⅝" rope 715' long
Link-Belt steam cranes
Vibrator, conveyors, ring crushers elevators, pumps, blowers and so forth.
Steam turbines and all complementary equipment, presently operating 2300V, 5100 KVA output 60 Cyc. 3600 R.P.M. continuous including transformers, switchboards, motors, condensors, etc.

**All the above equipment located at Mines No. 7 at Staunton, Illinois, Mine No. 15 at Mount Olive, Illinois, formerly operated by the Consolidated Coal Company.**

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# COAL MINE MACHINERY CO.

**231 So. La Salle St. Room 1257 Chicago 4, Illinois**

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## 42-T WELL DRILL

Diesel or full electric powered — with or without jacks — 35000 to 55000 series.

## 29-T WELL DRILL

4400 Cat. engine, — Combination 6 & 9" tools.

## Frank Swabb Equipment Co., Inc.

313 Hazleton Nat'l Bank Bldg.
Hazleton, Pa. Telephone 4910

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## Magneto* Telephones

Western Electric powerful 5 bar generator wall telephone with french handset on side.
Unit refinished, tested & ready to talk

**PRICE $17.50**

## Bohnsack Equipment Co.

GERMANTOWN, NEW YORK

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## LOCOMOTIVES

2—7-Ton General Electric Battery Locomotives, 36" gauge, permissible type.
2—8-Ton General Electric Battery Locomotives, 36" gauge.
2—8-Ton Goodman Battery Locomotives, 36" gauge, permissible type.
4—10-Ton Atlas Battery Locomotives, 36" gauge.
1—5-Ton Jeffrey Trolley Locomotive, 36" gauge.
1—6-Ton Goodman Trolley Locomotive, 36" gauge.
1—5-Ton Goodman Trolley Locomotive.

## HOISTS

3—52 HP Vulcan #4½ Hoists with motors and controls
1—112 HP Vulcan Hoist with Motor and controls
2—150 HP Vulcan Hoists with Motors and controls
1—375 HP Box Hoist with motor and controls
4—5 HP Sullivan Room Hoists
1—7½ HP Ingersoll-Rand Single Drum Tugger Hoist
2—10 HP Sullivan 3-drum Scraper Hoists
1—25 HP Sullivan 2-drum Scraper Hoist

## LOADERS & CONVEYORS

2—8BU Joy Loaders.
2—61EW Jeffrey Elevating Conveyors.
1—61 HC Jeffrey Chain Conveyor, 90'.
2—61W Jeffrey Chain Conveyors, 200'.
8—G-20 Goodman Shaker Conveyors.
1—G-15 Goodman Shaker Conveyor.
8—Vulcan Conveyors.
10—Goodman HA Duckbills.

## MINING MACHINES

1—7B Sullivan Mining Machine
11—CE7 Sullivan Mining Machines
2—CR3 Sullivan Mining Machines
3—112A Goodman Mining Machines

## FANS

1—#8-H Jeffrey "Aerodyne" 42" Fans
1—Jeffrey 8 x 4 Fan
6—Jeffrey Aerodyne Midget Fans.
8—Jeffrey, Type 61, Blowers.

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10—Chicago-Pneumatic Permissible Coal Drills
125—60 Cu. Ft. Card Steel Coal Mine Cars, 36" gauge
1—24" x 24" Jeffrey Single Roll Crusher

**Approximately 1000 tons 30, 40, 50, 52, 60 and 85# relaying rail. Send for complete Calumet listing of coal mining machinery and also Bulletin 521-C describing our vast stock of dependable reconditioned mining and milling machinery, electrical, industrial and construction equipment.**

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8R4417 with LaPlante-Choate hydraulic Bulldozer. 5000 hrs., guaranteed. $10,500. Also LeTourneau Model K, 12 yd. struck pan with 3 extra tires, $2000.

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Norton, Va.

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**FOR SAFETY**
**NEW CROUSE HINDS**
**EXPLOSION PROOF TELEPHONES**
Immediate Delivery
At Fraction of Current Cost
$375.00 MODEL ETG-34 @ $100.00
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Loud Ringing Bells Included
**GENERAL TRADERS, INC.**
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**CATERPILLAR D6 ANGLEDOZER**

Caterpillar D6, Diesel, latest model, 9U series, wide gauge, heavy front idlers and rail guards, 18 inch pads, oil pan and radiator guard, with hydraulically controlled angledozer attached. Unit repainted. Looks and runs like new. Low hour reading. Price $8250.00.

O. C. Evans — Mt. Sterling, Ky.

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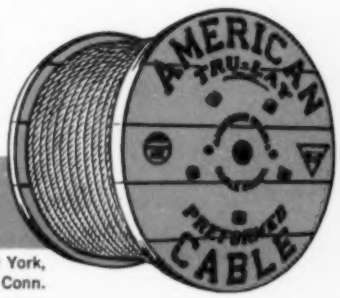
# TRU-LAY Preformed WIRE ROPE

● For each use there is *one best* wire rope . . . one that will stand repeated loading, abrasion, crushing, or continuous bending, and be the best rope to buy.

To achieve this, there is a TRU-LAY Preformed Wire Rope made in a special construction for your equipment. This construction has the exactly right combination of strength, bending life, and resistance to wear and crushing that you need.

The one best wire rope . . . TRU-LAY Preformed . . . will last you longer and cost less to use. Specify and get TRU-LAY Preformed improved plow steel—the rope identified by the Green Strand.

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AMERICAN CABLE DIVISION
AMERICAN CHAIN & CABLE

Wilkes-Barre, Pa., Chicago, Denver, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

# How to make your coal more marketable

**LINK-BELT Multi-Louvre dries minus 28-mesh coal without oxidation . . . at lower cost**

IF YOUR customers have trouble unloading coal from hopper cars in winter . . . if they're tired of paying freight on water — here's a simple, low-cost answer to high-moisture coal.

Link-Belt's Multi-Louvre Dryer offers new economies, new flexibility in coal drying. It is lower in cost . . . lower in maintenance . . . lower in power requirements. Add these to high capacity without oxidation and with minimum degradation — and you have the ultimate in modern coal drying.

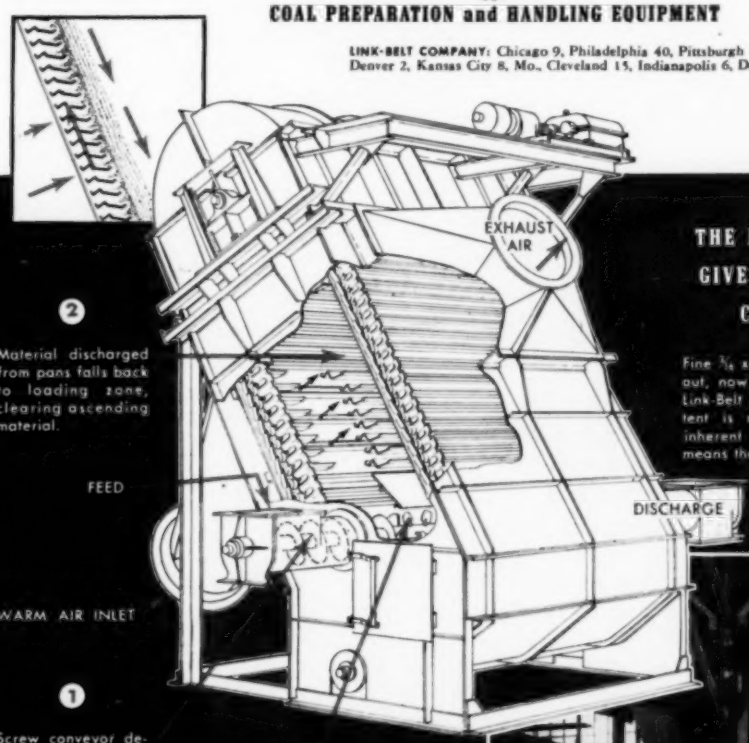
Multi-Louvre Dryers give you a more marketable coal . . . from the smallest fines to 1½-inch lumps . . . in volume up to 150 tons per hour from a single dryer. Contact your nearest Link-Belt office for full information.

12,455-A

**LINK-BELT**

**COAL PREPARATION and HANDLING EQUIPMENT**

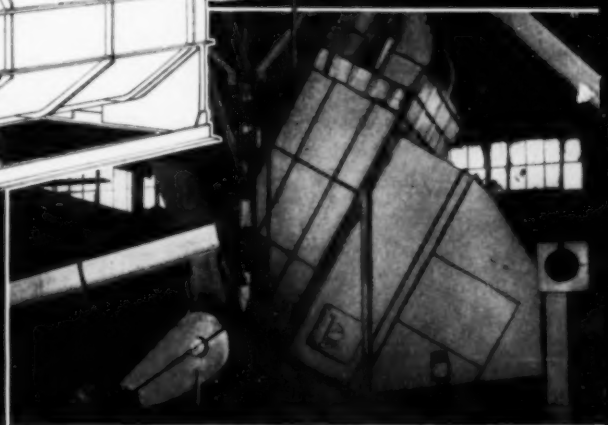
LINK-BELT COMPANY: Chicago 9, Philadelphia 40, Pittsburgh 13, Wilkes-Barre, Huntington 9, W. Va., Denver 2, Kansas City 8, Mo., Cleveland 15, Indianapolis 6, Detroit 4, St. Louis 1, Seattle 4, Toronto 8.




**2** Material discharged from pans falls back to loading zone, clearing ascending material.

**1** Screw conveyor delivers coal to pans at near side.

**3** When material, after several passes through the air stream, has traveled to the far side, it is discharged by the second screw conveyor.

## THE MULTI-LOUVRE DRYER GIVES YOU FAST, GENTLE, COMPLETE DRYING

Fine ⅜ x 0 in. coal, which was formerly thrown out, now is made marketable by means of this Link-Belt Multi-Louvre Dryer. Total moisture content is reduced from 21% to 10.5%. The inherent moisture in this coal is 10.5%, which means the coal is surface dry. This process also involves use of a Link-Belt vibrating screen, screw conveyor, dewatering bins and mechanical power transmission machinery.